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ABSTRACT

In 1973, the Polytechnic Institute of Brooklyn and the New York University School of Engineering and Science merged to form the Polytechnic Institute of New York, acquiring the largest graduate engineering enrollment in the U.S. Activities carried out under a Carnegie Corporation of New York grant are summarized in this report. It is shown that the merger represented a unique event in American higher education, but that the lessons to be learned--both from the lengthy and traumatic period before the merger and its aftermath--could be of assistance to trustees, students, faculty, and administrators of other institutions contemplating merger. It may also be of some interest to government agencies and legislators who oversee higher education institutions, to foundations, and to others concerned with educational leadership who have not had direct experience with merger. Appended are texts of agreements, excerpts from interviews, the report schedule required by the State Department of Education, and a bibliography. (LBH)

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PLANNING AND EVALUATING AN ACADEMIC MERGER AND MAKING IT WORK

Final Report to the Carnegie Corporation of New York

by George Bugliarello and Henry Birnbaum

Project Coordinator: Harold Margolin

U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
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Polytechnic Institute of New York

PLANNING AND EVALUATING AN ACADEMIC MERGER, AND MAKING IT WORK

Final Report to the Carnegie Corporation of New York

by

George Bugliarello and Henry Urrows

Project Coordinator: Harold Margolin

Polytechnic Institute of New York

April 15, 1976

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Glossary of Acronyms

AAUP	=	American Association of University Professors
ACEE	=	Advisory Committee on Engineering Education
CUNY	=	City University of New York
FTE	=	full-time equivalent
NSF	=	National Science Foundation
NYU	=	New York University
PIB	=	Polytechnic Institute of Brooklyn
SED	=	State Education Department
SERI	=	Solar Energy Research Institute
SES	=	School of Engineering and Science
SUNY	=	State University of New York

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George Bugliarello, President

Polytechnic

PLANNING AND EVALUATING AN ACADEMIC MERGER

AND MAKING IT WORK

Final Report to the Carnegie Corporation of New York

E R R A T A

1. Page 8, Footnote, line 2, should begin: The Spring of '72
2. Page 25, Paragraph 2, lines 3 and 4: ...administration's intention to find more space through
3. Page 95, Paragraph 3, line 6: on state tax income. The Association of American Colleges has issued....
4. Page 106, Paragraph 2, line 2: perturbation than among those whose ...
5. Page 109, Paragraph 4, line 4: entities. There should be a periodic monitoring.
6. Page 110, first line: After the merger Polytechnic mounted a major effort to inform the community
7. Page 110, Paragraph 5, line 3: ...We are indebted to Montesquieu's early paragraphs in his eighth book of ...
8. Page 114, penultimate line: average GRE score
9. Page 183, first line: Lessons learned in aftermath of merger

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FOREWORD

In 1973 the Polytechnic Institute of Brooklyn and the New York University School of Engineering and Science merged to form the Polytechnic Institute of New York. The resulting new institution acquired the largest graduate engineering enrollment in the United States, the largest engineering enrollment in New York State, and the largest total engineering enrollment of any member of the Association of Independent Engineering colleges. *

In the Fall of 1973 the Carnegie Corporation of New York made a grant of $350,000 to the new Polytechnic Institute of New York for the evaluation of the new institution that arose out of the merger and for the planning of its future.

This report summarizes the activities carried out under the grant. It follows a series of progress reports that should be considered an integral part of our account. In writing this final report it became clear that the merger that led to formation of the new Polytechnic represented a unique event in American higher education, but that the lessons to be learned -- both from the lengthy and traumatic period before the merger, and its aftermath -- could be of assistance to trustees, students, faculty, and administrators of other institutions contemplating merger. It may also be of some interest to government agencies and legislators who oversee higher educational institutions, to foundations, and to others concerned with educational leadership and who have not had direct experience with the complex and difficult factors that attend a merger.

Unlike mergers in the business world, academic mergers have attracted little attention. The lack of information is aggravated by the myth that academic mergers are easy to carry out. Thus we hope that a detailed history of one merger with enough facts about its aftermath to spell out what lessons were learned should be of some value to others.

*The members of the Association are: California Institute of Technology, Carnegie-Mellon University, Case-Western Reserve University, Clarkson College of Technology, Cooper Union, Drexel University, Harvey Mudd College, Illinois Institute of Technology, Lehigh University, Massachusetts Institute of Technology, Polytechnic Institute of New York, Rensselaer Polytechnic Institute, Rice University, Rose-Hulman Institute of Technology, Stevens Institute of Technology and Worcester Polytechnic Institute.

Without doubt, as trouble in higher education reaches epidemic proportions, the thought of merger will recur with increasing frequency. In New York State alone, 135 of 259 colleges were said in late February 1976 to be "operating deeply in the red." Across the nation a September 1975 summary listed 56 private colleges that had closed since 1972 while only twelve mergers took place in the same period.

Even though the March 1973 merger agreement that resulted in the new Polytechnic Institute of New York appears to us to have been conceived with stipulations so unrealistic they were equivalent to madness, in its potential importance to the metropolitan New York community it was also a considerable opportunity. There was madness in imagining that a new Polytechnic could substantially expand the obligations inherited from its precursors and yet become able to balance its budget in only two years. It was an opportunity because in the metropolitan New York area excellence in engineering education and finding solutions to the enormous technological problems affecting the region are sorely necessary.

This report is not a study of academic mergers on the scale of the study the Academy for Educational Development is making for the Carnegie Corporation. Rather, it is centrally concerned with the aftermath of one merger, the one at Polytechnic. In assessing it, we have found it essential to clarify in considerable detail its antecedents. In the process, we have sought to isolate questions affecting institutions created by merger. Among these questions are:

What were the good and bad features of merger that shaped the outcome? These have centrally affected current planning for Polytechnic. For years to come, we will live with the results of decisions taken during the process of merger.

Put another way, if we had it to do over again, what should and could we have done differently? What are the difficulties in making a merger work?

What concepts emerge out of our experience? What constraints exist that prevent or impede doing what is best for the institution's students and faculty, and its potential for public service? In having gone through the fire, what have we learned that can conceivably benefit others?

Neither of the co-authors took part in the merger negotiations nor the events that led up to them. In respect to these events, this is an

exercise in hindsight. Where our sources or we assert that decisions other than those that were made would have been better, we do not know if under actual conditions of negotiation these options were in fact available.

Financial stringency will continue to hamper higher education as far as we can foresee. Institutions must now anticipate another over-all downturn in enrollments, hard competition for research support from traditional sources, and soaring costs for sophisticated equipment and adequate work space. These adversities promise to intensify as society's need and demand for better answers to its technological difficulties grow more insistent.

Merger is one extreme answer. How institutions merge can make a lot of difference in how well they succeed in performing essential services under always less than ideal conditions. We reiterate the hope that this case study of one merger and its still unfolding outcomes can be of interest to others who face comparable problems.

George Bugliarello
Henry Urrows

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Any errors or omissions are the authors' responsibility.

G. B. H. U.

THE PARTIES TO MERGER -- PIB AND SES

For our purpose in discerning lessons learned from the 1973 merger of the New York University School of Engineering and Science (henceforth called SES) with the Polytechnic Institute of Brooklyn (PIB) to create the new Polytechnic Institute of New York (Polytechnic) we focus on factors that are germane to merging any two academic institutions.

These are legal status and principal functions of each institution; governance and control; finance structures, such academic characteristics as faculty, students, curricula, research, and plant, and perceptions of their quality, strengths, and weaknesses by professional educators, funding and government agencies, the larger community, and alumni.

Both SES and PIB were private since their founding in the same year, 1854. The two institutions were alike in educating undergraduate and graduate engineering students, in having built faculties that included men and women noted for research in their special fields, and in their feeling competitive for students and research contracts. Both were primarily commuter colleges, offering preparation in science and technology enriched by humanities and social science to an upwardly mobile middle class clientele. As with a large share of engineering students nationally, most students were the first members of their families attending college.

Their histories were somewhat different. SES had begun as NYU's School of Civil Engineering and Architecture in 1854, expanded in 1894 when the University moved to its new Bronx campus, and was again enlarged in 1899 into the School of Applied Science. The name became College of Engineering in 1920 and changed to SES in 1963. PIB's start in 1854 was as the Brooklyn Collegiate and Polytechnic Institute, a preparatory school and junior college with a "high classical" program for "lads and young men." By 1863 expansion extended "instruction in higher science, chiefly in Civil Engineering and Mining," and in 1889 a new charter was awarded to the PIB. With dissimilar origins, both schools developed in keeping with the country's rapid demand for engineers.

Early in the twentieth century, they became democratized. In 1904 PIB began undergraduate evening courses, equivalent in standards and content to those given in the daytime. In 1916 SES offered noncredit

evening engineering courses that became complete curricula leading to degrees in 1922.

These made it possible for young men employed in industry, previously excluded from higher education, to earn recognized degrees at truly professional levels. To earn a Bachelor's degree at night took at least eight years. After World War I Polytechnic became the first college to offer graduate degrees in science and engineering at night. A doctorate meant ten to fifteen years after the B.S., requiring immense labor in addition to demands from job and family.

In the period from the end of World War II up into the early 1960's Polytechnic accomplished more in the way of educating students and carrying out research, with sharply limited resources and unfavorable conditions, than most engineering schools. Worse than the relatively poorer pay to faculty were such facilities' limitations as insufficient classrooms, scarcely enough space for students to study, crowded library, and a neighborhood wholly different from a campus atmosphere. A former professor believes that despite these circumstances there was during this period "a tremendous esprit among the faculty, a great relationship between the faculty and students, and the administration. It was really an institution where people pulled together and accomplished tremendous things, when one looks at what they had to work with."

PIB's climb from its origins to a place where it looked down at its evening session is analogous to NYU's drive for Excellence that put it above its traditional clients.

Many PIB faculty members regarded the evening session as an academically second-rate operation that sullied its reputation. Younger teachers were loath to teach at evening sessions they regarded as an imposition. A former teacher and administrator says they reflected the unreality so many persons lived in during the 1960's:

> "We became a captive of our publicity releases. Those who actively tried to discourage the evening session simply had no appreciation of the part it played in the financial health of the Institute. The evening courses provided the money that permitted some of these same faculty who opposed them to do what they were doing.
>
> "You had your plant, so there was no additional overhead. Every classroom was filled every night every hour. We had the biggest

part-time engineering enrollment in the country. And it was throwing off money.

"When Jim Hester went to NYU he had some of the same unreality. Much of NYU's operation -- not the Engineering School, but the School of Commerce and some other programs -- were fairly low-level academically in terms of Harvard, MIT, and the Ivy League. But they were crowded with students. They provided an opportunity for education to the middle to lower half of the academic spectrum. They made for the largest university in the country.

"Without realizing what that was doing for NYU financially, [NYU] went for Excellence. Full-page ads said that NYU was going to be an intellectual leader. [It] reorganized, upped the admissions standards, and succeeded in cutting their enrollment from 50,000 to 30,000. Later on, that got blamed on the New York atmosphere that really had nothing to do with it.

"The same kind of atmosphere grew at Poly, where there was simply not an understanding of the job we were doing for the evening student as a social service, the advantage of bringing in part-time engineering practitioners, and the tremendous financial advantage to the institution."

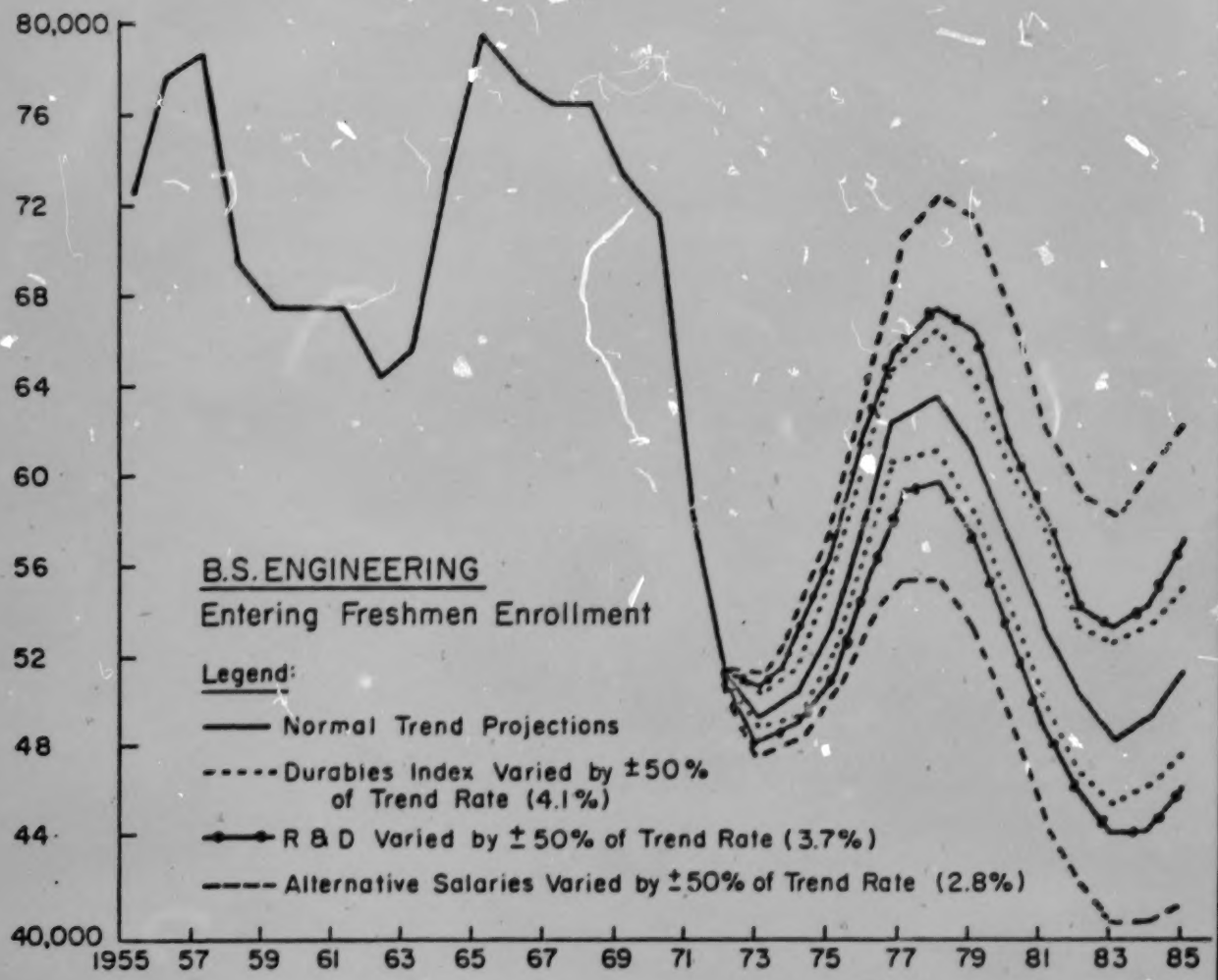
The obvious difference in governance was that SES was only one unit of NYU, directed by its own Dean, while PIB was an independent institution with its own charter and Corporation controlled by a Board of Trustees. The SES Dean reported to the Provost of the University Heights campus, who in turn was responsible to the NYU Vice President for Academic Affairs. PIB had a President unto itself, who had under him separate divisions headed by a Vice President for Academic Affairs, Vice President for Administration & Finance, Dean of Students, and Director of Libraries.

President James M. Hester of NYU had to concern himself with the well-being of a University with many different units. To save the whole university, he was forced to find SES expendable. President Arthur Grad of PIB, his predecessors and successors, could concentrate on the fate of a much more homogeneous institution.

Financial Condition

SES and PIB both had serious deficits. Their principal cause was the national decline in engineering enrollments (see Chart A) and cutbacks in federal research funding.

CHART A



Source: MIT, Center for Policy Alternatives -- from Future Directions for Engineering Education, American Society for Engineering Education, 1975

The broad down-trend in SES income was dramatic:

	1971-72	1972-73
Tuition income	$4,034,533	$2,966,280
Indirect expense recovery	922,318	923,994
Sponsored research, direct recovery	2,841,330	2,451,451

This was a continuing trend. The peak of SES research had been at a $6 million annual level, in 1966.

Some of the difficulty persisted from earlier capital expenditures. Although the National Science Foundation had granted $2,262,250 toward the new Tech II building, NYU had also borrowed $7.8 million from the State Dormitory Authority in the form of bonds.*

NYU had two alternatives: to sell its University Heights campus or to exhaust all its unrestricted endowment, that was being eaten away since 1969:

Faculty size at the two schools for about the same student enrollment were about the same if one were to count those teachers at SES who enjoyed joint appointment there and at the University Heights College of Arts and Sciences. Counting them SES had a 1967-68 faculty of 225 full-time equivalent members. There were 224 at PIB. By 1972-73, full-time tenured faculty by rank at the merging institutions -- not counting those people in Mathematics, Chemistry, and Physics with joint appointments who were not considered part of merger expectations -- compared as follows:

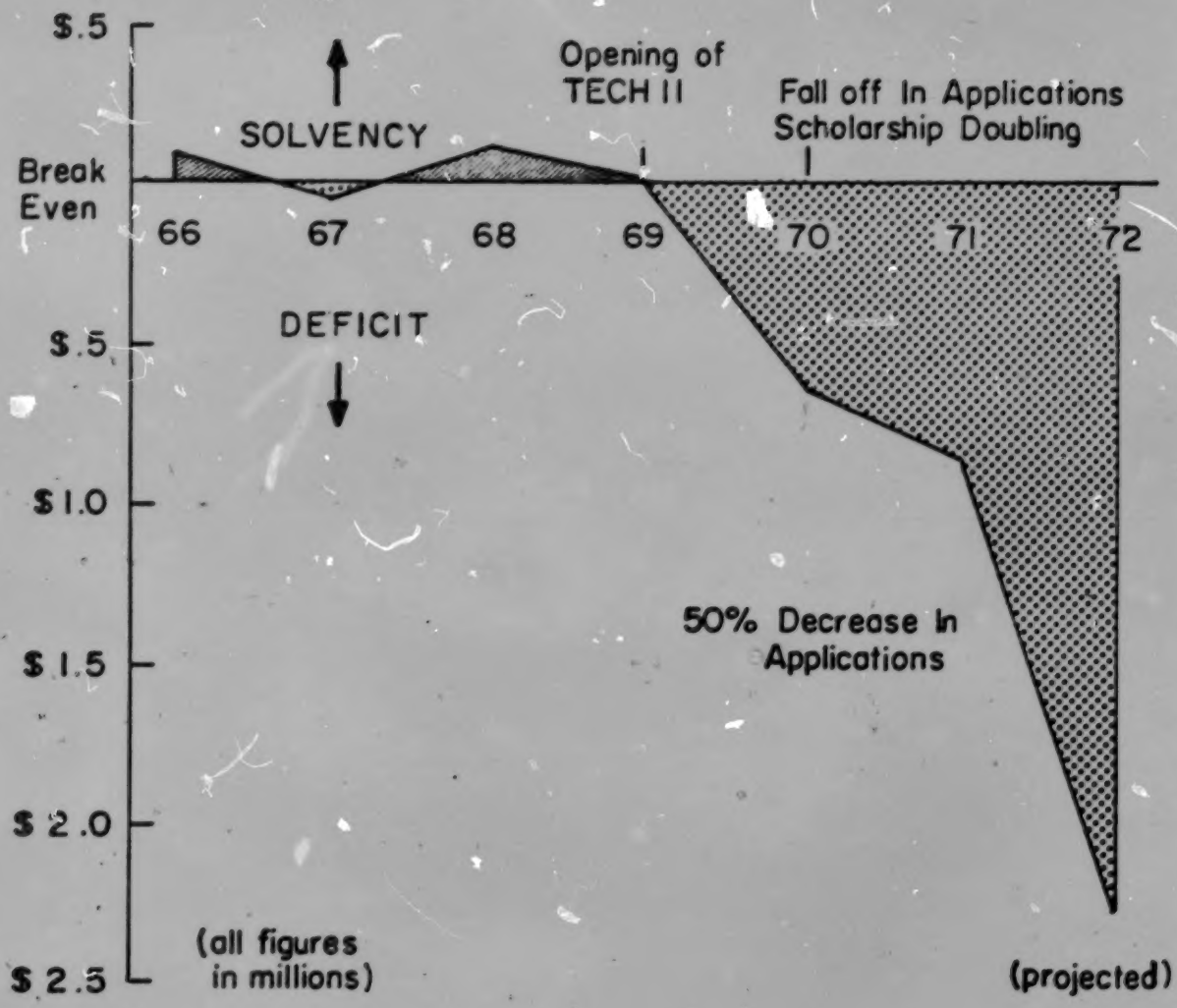
	Prof	Asso	Asst	Inst	Totals
NYU-SES	55	36	9	1	101
PIB	98	89	40	25	252

*These required payments of $290,219 in 1971-72 and $291,617 in 1972-73, plus debt retirement installments of $147,530 and $157,340 in those years respectively.

The 1972-73 SES deficit was $1,911,299. It was the difference between current expense that totaled $6,331,535 and revenues of $4,391,099. Cost items were principally $2,879,838 for instruction and departmental research, $1,367,194 for maintenance of plant, $462,505 for sponsored research, $355,575 for general administration, $352,834 for student services, $322,237 for general institutional expense, and $313,405 for library service. It was also part of a total University Heights campus deficit of $3,606,664 that was in turn part of the overall NYU deficit of $11,763,261.

CHART B

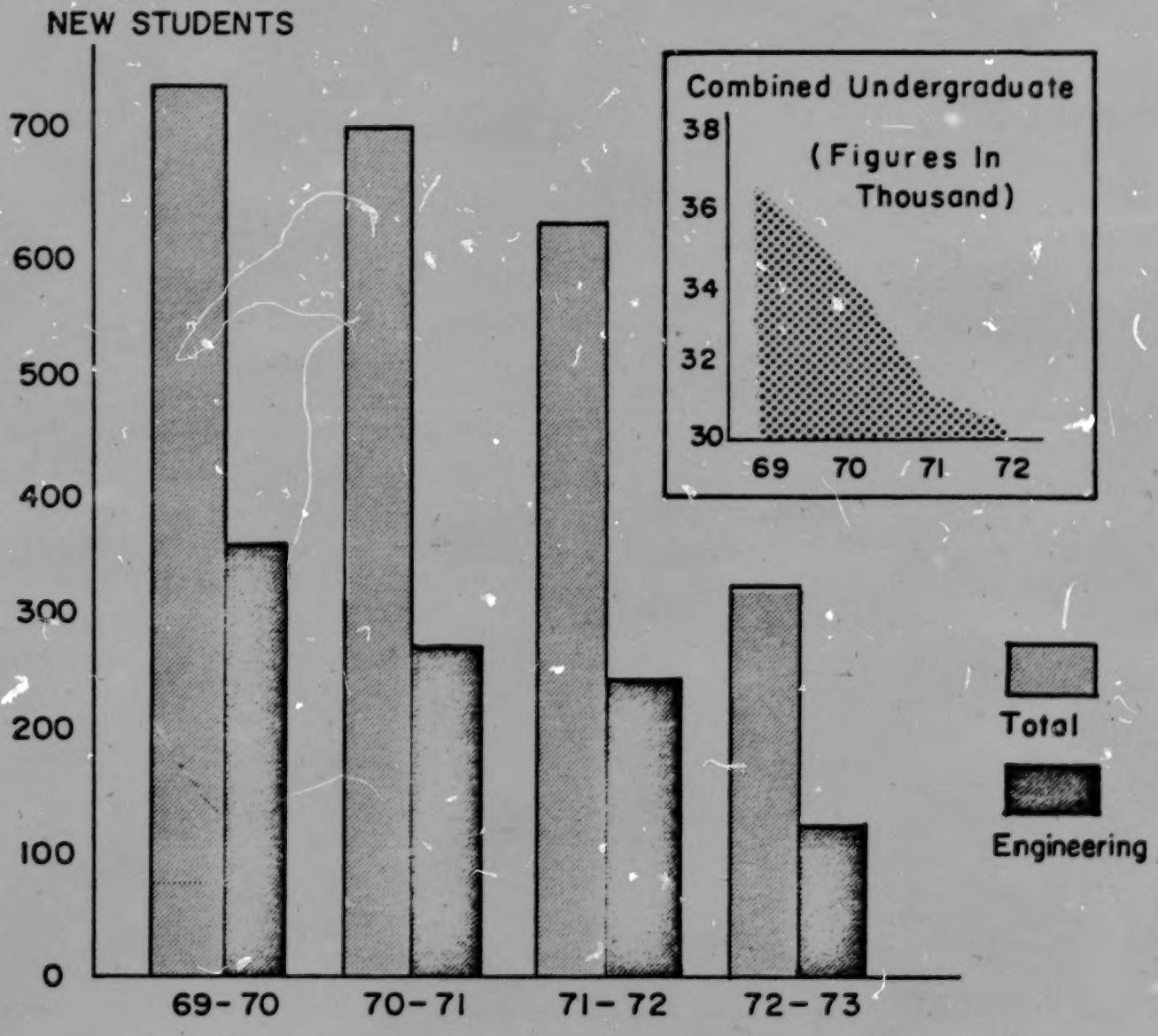
NYU Engineering School: Direct Deficit



SOURCE: Heights Daily News (student publication)

CHART C

Decline in New Undergraduate Admissions NYU Bronx Campus



SOURCE: Heights Daily News (student publication)

Student comparisons for pre-merger years show:

	Fall 1966	Fall 1967	Fall 1968	Fall 1972
Undergraduates				
NYU-SES	1,361	1,430	1,565	786†
PIB	1,944	1,904	1,820	1,720
M.S.				
NYU-SES	1,081	1,211	1,329	*
PIB	1,803	1,722	1,548	1,247
Ph.D.				
NYU-SES	530	578	595	*
PIB	617	675	690	463

*total 1972 SES graduate students = 1,177

Enrollments began to drop in the Fall of 1968. Graduate students at SES by 1972 totaled 1,000 less than had been predicted. At first this was considered a temporary reflection of abolished student draft deferments. NYU later attributed its over-all decline across the university to lurid national news coverage of New York City crime that may have discouraged out-of-city students.

Although SES people looked down on both the Greenwich Village location of the downtown NYU campus and the Brooklyn main site of PIB, its own Bronx neighborhood surrounding University Heights was deteriorating. In 1971-72 there was increasing crime on campus, including two rapes.

Curriculum

SES and PIB both offered degrees up through doctorates in thirteen and eighteen fields respectively. They were alike in being empowered to confer the Ph.D. in Aeronautics & Astronautics; Chemical, Civil, Electrical, Industrial, and Mechanical Engineering, and Metallurgy. SES had two departments, Meteorology and Oceanography and Nuclear Engineering, that PIB did not have prior to merger. SES also had programs in Environmental Health Science, Engineering Science, and Materials Science that PIB did not present as separate offerings. Conversely, PIB listed as separate special degree programs Applied Mechanics, Bioengineering, Polymer Science and Engineering, Polymeric Materials, System Engineering, and Transportation Planning and Engineering apart from the broader disciplines from which they had developed.

† The Fall 1972 enrollment was of course affected by the announcement in the spring of .72 that the Heights Campus would close.

Where the two institutions had departments in the same engineering field, it was later found that their courses were more alike than had been expected. A signal difference was the number of credits required for the Bachelor's degree. PIB required 136, while SES demanded 124. Ph. D. requirements were nearly identical, including one foreign language. Graduate specializations differed somewhat in substance, but often only in nomenclature and emphasis, as in the Departments of Civil Engineering:

SES	PIB
Structural Engineering & Structural Mechanics	Structural Engineering
	Soil Mechanics and Foundation Engineering
Sanitary Engineering and Environmental Health Sciences	Environmental Engineering
Hydraulics	Environmental Planning
Hydrology and Water Resources	Water Resources Engineering

SES had an Aerospace Research Laboratory beside the Harlem River. PIB's 25-acre campus at Farmingdale, Long Island was the site of its extensive Graduate Center.

A major difference between the curricula was that while PIB conferred degrees in Chemical Physics, Chemistry, Electrophysics, Mathematics, and Physics, SES did not. Programs in the sciences were available to SES students through the University College arts and sciences departments on the same Heights campus. PIB had a Science Division comprising these four departments, with courses in Life Sciences given by biologists and biochemists in the Chemistry Department. It also had three departments grouped as Humanities and Social Sciences (English and Humanistic Studies, Modern Languages, and Social Sciences) that enabled undergraduates to earn B. S. degrees majoring in Humanities, Pre-Medicine and Social Sciences and graduate students to get an M. S. in History of Science. Again, SES did not need these because of University College at the Heights.

Facilities

One recently improved SES glory was its plant. Tech II was the $10 million new engineering building designed by Marcel Breuer for a hoped-for 1, 000 students. Officially opened in 1969 but not fully occupied until 1970-71, it was probably the most advanced center for teaching engineering on the entire U. S. East coast.

As an example, Tech II's industrial pilot plant had over forty feet head room, with balconies at several stages of its three-story height so that technicians and students could take readings off a pilot evaporating column. Construction and furnishings had been budgeted at $6 million. They cost "a bit less than $10 million" plus interest and carrying charges.

This structure consolidated much of what had been scattered SES work spaces, several of them off campus. The older buildings it replaced were conversions of a former Consolidated Edison power plant, a two-family house, rented space in an office building, and what had been a World War I barracks.

SES also had an Aerospace Laboratory beside the Harlem River, gave evening classes at the downtown Washington Square campus, and operated the oceanographic research vessel "Kyma."

PIB had visibly more modest but larger headquarters in Brooklyn and a 25-acre graduate center in Farmingdale, Long Island. In 1954 it bought a square block of factory buildings that had been the American Safety Razor plant, which it renovated and supplemented with three other properties. The Long Island campus opened in 1961 has three large buildings and two ancillary research structures. The Main Administration center has classrooms, an auditorium, library, and 13 laboratories. The center includes the Preston R. Bassett Research Laboratory for advanced hypersonic aerodynamics research, built with NASA help and dedicated in 1966. The adjacent Aerodynamics Test Building has shock tubes and a wind tunnel able to operate at speeds up to Mach 18 and temperatures above 17,000° Fahrenheit -- one of the most advanced facilities of its kind in the country.

Perceptions

Despite these additions made less than a decade before SES improved its plant with Tech II, NYU faculty thought of PIB as a dilapidated Brooklyn factory. As an engineering education resource, PIB's American Council on Education ratings were higher than those for most SES departments. Still, NYU faculty felt that to merge with PIB would mean a descent in class.

In his supplement to a 1969 study of Engineering Education in New York for the State Education Department, Stanford Provost Emeritus Frederick E. Terman pointed to a major reason for Polytechnic's

financial woes: "PIB has concentrated its attention on improving academic quality and on rendering service to its community, and has assumed that if these objectives were carried out well, finances would take care of themselves.

> "An example of this approach is provided by PIB's successful application for a $3.4 million three-year NSF Center of Excellence grant. In applying for this grant, Brooklyn Poly made commitments for concurrent expansion of faculty with its own funds, in addition to guaranteeing that after expiration of the NSF grant it would continue with its own funds many activities initiated with grant funds. While a recent PIB two-year extension of the NSF grant has provided supplemental funding that postpones the grant expiration date until 1970 or 1971, a day of reckoning is still ahead."

Dr. Terman observed that at the time of this NSF application Brooklyn Polytechnic had an annual operating deficit of approximately $700,000. Its decision was to move ahead "in belief (or hope) that major academic improvement would generate through gifts, growth in research funds, and increased enrollment that new income needed to cover the additional expense."

> "A school with cautious financial management would in such a situation have come to the conclusion that 1965 was no time in its history to take on additional commitments ... If PIB had followed this conservative course, its financial problems now would be much less severe, but also the institution would not be nearly as strong academically as it is today. In a way, one can say that with the best of motives PIB gambled and as a consequence ended up in trouble, partly as a consequence of national developments (such as leveling off of research funds) over which it had no control."

SES faculty enjoyed the amenities of a Faculty Club at the Heights and privileges of using the NYU-purchased Town Hall Club in mid-Manhattan. They took satisfaction in their right to send those of their children who qualified for admission to any part of the University to attend tuition-free. The University Heights alumni felt superior to their counterparts who had attended the Washington Square campus, saying that the Heights was the Ivy League part of NYU.

PIB faculty confidence in its scientific and professional eminence was continuously reinforced by awards, invitations to deliver lectures at national meetings and in foreign capitals, and by new editions and translations of their published work.

A salient difference between the two faculties was that PIB's American Association of University Professor chapter had been certified as a bargaining agent. Former PIB personnel say that its generally conservative faculty would never have voted to be represented by a union if there had not been such financial uncertainty and resulting turmoil. There was a prevailing attitude that administrative operations were poorly managed. The faculty believed itself as deeply devoted to the fate of the Institute as any Trustee or administrator. Former SES faculty speak of the SES administration with scant admiration for its efficiency and foresight; some exempt President Hester from opprobrium, feeling that he did everything he could to save NYU and that he surrounded himself with able executives at the central administration level. Others, however, felt that the financial policies of the NYU central administration -- particularly the giving of raises in the face of a major deficit -- contributed in a major way to the inability of NYU to withstand its financial expenses.

Both faculties had their notable entrepreneurs, authorities in their particular fields who were in strong demand as consultants and visiting lecturers, invited to serve on panels advising government agencies. These were the most mobile people. Both institutions lost some persons of stature during the period when the future was in serious doubt, but surprisingly very few.

SES students and alumni identified themselves as members of the University Heights campus, a community they felt the larger University did not fully understand. Mike Bassett, former editor of the Heights Daily News, wrote an article for its May 11, 1972 issue. In it he gave his interpretation of NYU downtown view of the Heights:

> "The trouble was that he [former NYU President Henry Mitchell McCracken] stuck it with this funny-looking relative in the Bronx.
>
> "As far as the people at the Square were concerned, there was this pile of architecture up there. Stanford White designed it. NYU teams played there. But the people up there were different. God knows what they looked like, how they talked...
>
> "In recent years, Heights students who went down to meetings weren't treated rudely. It was just that nobody knew what the hell to do with them. Some Heightsman would walk into an all-University meeting or something or other and sit down. Everybody else would be from the Square...
>
> "When the poor fool allowed that he was from University Heights, a silence would ensue. Stares. So that's what they look like. I never saw anybody from the Heights before.

> "Washington Square people sometimes acted as though the Heights was sort of a Northeast Frontier for NYU. Uncharted. Inaccessible. It was surprising that the Heights-Square limousine didn't have a campus cop riding shotgun.
>
> "The central administration some years back came up with a way of handling the Heights question: appoint a colonial administrator with the title of provost . . ."

If SES felt estranged from the bustle of Greenwich Village, it felt even more remote from the alien corn of Brooklyn.

PIB alumni and students had an alloy of "poor boy" and "old boy" sentiments -- the first being a pride in having earned their way up from humble origins, and the latter a camaraderie gained while surviving rigorous requirements at PIB and since. PIB was also highly regarded by employers whose companies had hired graduates.

Neither school had developed strong support from among the highest decision-makers in finance, industry, and public life. They lacked any consistent records in effective fund raising.

SES was assigned part-time services of a development assistant by the University. When the larger body considered eliminating two of its Schools -- SES and the Graduate School of Social Work, only the School of Social Work found survival through a campaign for private support. When NYU announced plans to phase out the School of Social Work by 1974 and to stop accepting new students for entrance in the fall of 1972, a committee formed. Led by David Sher, prominent lawyer and chairman of the Community Council of Greater New York, it raised over $1 million. Gifts and grants came from the Field, Rockefeller, Edna McConnell Clark, Nathan Hofheimer, Robert Sterling Clark, and Herman Muehlstein Foundations, Lavanburg Corner House, the Henry & Lucy Moses Fund, J. M. Kaplan Fund, and Wertheim & Co. But for SES, unfortunately even with the splendor of Tech II, NYU had not obtained a "name" gift for that rare edifice.

Readers even casually exposed to university micro-economics know how much larger are the deficits incurred by colleges of engineering than those at schools of social work. The $1 million raised privately was expected to cover four years of the Graduate School of Social Work deficit. That sum would barely cover six months' deficit at SES. The fact at issue is that philanthropic interests in greater New York knew about the School of

Social Work problem and considered it important. So far as we can tell, the SES administration had scant contact with decision-makers at general and corporate foundations. Like the PIB administration, its fund raising from among alumni and other private sources of support was modest in 1972 fund-raising terms.

SES was a stepsister in the NYU family. President Hester had succeeded in leading a successful $100 million campaign. Apparently, SES alumni did not make major gifts or take visibly central leadership roles in that effort. Dr. Hester's triumphs came after thorough groundwork in cultivation of donors sources by Presidents Henry H. Heald and Carroll V. Newsom; throughout their administrations they allotted one full day every week to appointments made for them by fund-raising staff.

PIB's quest for voluntary gifts was more fitful. Income during the 1933-1957 administration of President Harry S. Rogers came primarily through profit-making evening courses and research grants and contracts, rather than fund raising. Dr. Rogers did not want to enter ambitious fund raising. He felt that because Polytechnic had a surplus of income over expense donors would not contribute.

It is said that during the 1933-1957 years there was a poor relationship with alumni. Dr. Rogers believed it was his responsibility to run the institution and it was not the business of alumni to know what was going on. The alumni are believed to have resented this attitude deeply.

Dr. Ernst Weber, professor of electrical engineering and vice president for research, became the sixth president in 1957. He completed the move Dr. Rogers had begun from overcrowded Livingston Street quarters to the present location on Jay Street near the Brooklyn Civic Center. Costs had exceeded estimates and the $2,500,000 raised for the Centennial Building Fund was substantially short of its goal, leaving Dr. Weber saddled with the cost overrun. Dr. Weber succeeded, however, in transforming alumni relations to a feeling of identification with Polytechnic and willingness to support it.

In spite of its problems, PIB was able to raise funds. A summary of non-research gifts and grants for 1970-71 includes this breakdown in receipts from private sources:

	Firms	Foundations	Alumni	Friends	Totals
Unrestricted	$195,455	$ 2,046	$ 58,222	$ 5,391	$ 261,114
Restricted	38,600	292,400	225	1,205	332,430
Student Aid	15,480	58,403	4,075	11,689	83,647
Endowment	35,000	5,000	110,075	205,964	356,039
Plant	90,345	50,100	143,862	271,688	555,995
Library				2,350	2,350
Totals	$374,880	$401,949	$316,459	$498,287	$1,591,575

For Corporation trustees and a President intent on finding ways to make ends meet, the top horizontal line listing unrestricted gifts is the entry most germane toward making ends meet. PIB's record in attracting unrestricted gifts and bequests in the six fiscal years prior to merger showed peak and steady downward trend:

PIB ($ thousands)

1966-67	1967-68	1968-69	1969-70	1970-71	1971-72
354	259	600	524	261	161

When we consider the total revenues for these years ranged from a high of $14.7 million in 1969-70 to a 1971-72 doldrum of $11.8 million, and annual deficits excluding depreciation correspondingly rose from $894,000 to $2.8 million over these same six years, clearly fund raising from the private sector amounted to less than 2% of income.

PIB fund raising suffered from a lack of clearly defined objectives, unrealistic goals, a succession of staff directors trained on the job, sporadic efforts, and assumption that if academic goals were achieved support would automatically follow. It didn't.

Giants

Both institutions had for decades been blessed with faculty members whose stature was widely recognized. At PIB Dr. Ernst Weber, founder of the Microwave Research Institute, had retired as President but continued to serve actively on the Board. Arthur A. Oliner, Professor of Electrophysics, now directs the MRI. Dean Emeritus Herman F. Mark, also a Trustee, led the investigations into long molecules that yielded basic discoveries in polymer chemistry in association with the late Isidor Fankuchen, the still active Frederick R. Eirich, and the current Polymer Research Institute director Herbert Morawetz.

The late Gerald Osler brought PIB world renown for basic work on moire patterns, as does mathematician Wilhelm Magnus in group theory and mathematical physics still. In Chemical Engineering, Donald F. Othmer's contributions continue in numerous applied fields; he has carried forward the 22-volume Kirk-Othmer Encyclopedia whose first 15 volumes were edited by an earlier PIB Chemistry chairman.

Several noted scholars worked successively at PIB and SES. Antonio Ferri helped make PIB's Aeronautical and Aerospace Department a national resource before he became the Vincent Astor Professor at SES. Nathan Marcuvitz had been Distinguished Professor at PIB, then at SES, before joining the merged Polytechnic.

Both institutions has served as seed-beds. Former faculty and students are scattered through U. S. industry, government, and the leading technological institutes. *

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*Taking the single SES Department of Electrical Engineering, its former Professor James H. Mulligan, Jr. (who was Chairman from 1952 to 1968) is a former president of the Institute of Electrical and Electronic Engineers, was executive director of the National Academy of Engineering, and is now Dean of Engineering at the University of California at Irvine. Robert F. Cotellessa heads the Department of Electrical Engineering at Clarkson, Mohammed S. Ghausi at Wayne State, B. J. Ley at Manhattan College and Edward Wilson is Chairman of Civil Engineering at the University of Nebraska.

As randomly taking the single PIB Chemistry Department former faculty members, Turney Alfrey is now Distinguished Scientist at Dow Chemical, Ernest L. Becker is chairman of the Chemistry Department at the University of Massachusetts, Boston, while Louis Meites has that post at Clarkson, Charles G. Overberger is vice president of the University at Michigan, Rudolph A. Marcus is Professor of Physical Chemistry at the University of Illinois.

The writers wish they had, and tried unsuccessfully to get, comparable information on former SES students. Taking PIB alumni from the single department of Chemistry, they can cite T. Alfrey, Jr., Distinguished Scientist at Dow Chemical; M. Berenbaum, Vice President for Research at Allied Chemical; S. Bruckenstein, chairman of the SUNY-Buffalo Chemistry Department; G. DiBari, Manager of Research & Development for International Nickel; H. F. Hammer, Vice President of Pfizer, Inc.; R. V. Harrington, Vice President for Research at Ferro Corp.; W. S. Horton, Section Chief at the National Bureau of Standards; J. Lal, Manager of Polymer Research, Goodyear Tire & Rubber; E. F. Landau, Director of Corporate Planning, Allied Chemical; W. E. Leistner, Senior Executive Vice President, Witco Chemical Corp.; Eli Levine, Chairman of Yeshiva's Chemistry Department; L. Mandell, chairman at Emory University; H. Shalit, director, Physical Chemistry Research, Atlantic Refining Co; C. A. Sheld, head of the Bausch & Lomb chemical research laboratory;

(continued)

Intellectual assets are qualitative. Despite the American Council on Education "Cartter rating" that periodically rank the perceived reputations of graduate departments and faculties, it is not possible to calibrate the worth of scholars whose contributions open up entire new universes of theoretical and applied knowledge.

Each of the parties to merger brought considerable teaching and research talent that could launch a new Institute with a base of capabilities resulting from many years of development.

*(continued)
F. H. Siegele, manager of technical services for American Cyanamid; E. Steinberg, director at Warner-Lambert; S. Sussman, technical director of Olin Corp.; S. Symchowitz, head of the Schering Corp. biochemistry department; M. M. Taifer, vice president and general manager, Champion International; A. E. Vassiliades, Vice President for Research, U. S. Plywood; H. Wechsler, Executive Vice President, Beatrice Foods; J. M. Whelan, research director for Union Carbide; and M. Yamin, Staff Scientist, Bell Telephone Laboratories.

THE STRUGGLE TO SAVE SES

Dwindling enrollments and diminishing grant income were visible to all at SES as the '70's began. Rumblings of retrenchment and impending budget slashes were heard with increasing frequency. An entire floor of Tech II was rented to the U.S. Weather Bureau for $50,000. But if there was anyone who saw in this the impending dissolution of the campus, he has left no record. Disaster, when it came, was as sudden as a tropical storm.

Governor Rockefeller's call for sale of the University Heights campus to the State appeared in the New York Times on February 16, 1972. It was then that faculty and students awoke to the rising water at their doorstep.

It was President James Hester's hope to convert the SES facility into a city-wide undergraduate engineering consortium under SUNY auspices (and budget). In the words of the campus newspaper of the day, it was "sell or die."

By late March, staff from Washington Square were collecting information on the state of the Bronx campus buildings preliminary to appraisals for their sale.

Members of the SES faculty formed a Faculty Liaison Committee dedicated to saving the school. They hoped to mold the legislation to ensure SUNY's continuing operation of the school.

Any hope that President Hester may have had for a smooth and gentlemanly solution to his fiscal crises was soon lost in a welter of conflicting interests. Adherents of the City University of New York in the legislature, jealous of territorial prerogatives, resisted the idea of SUNY's expansion into the five boroughs. Instead they argued for city purchase of SES as a new home for Bronx Community College, threatened with loss of accreditation by reason of its inadequate quarters. CUNY's Chancellor Kibbee suggested combining the SES faculty with PIB--echoing a suggestion by PIB Provost James J. Conti on March 17. NYU Chancellor Alan M. Cartter termed this "a pipe dream."

The administration of NYU urged the Governor to press for SUNY's purchase of the campus. But SUNY was proving reluctant. Realizing what a large bite this purchase would take from its construction budget, SUNY stipulated that any such sum would have to be phased over several years.

In mid-April President Hester announced how critical the University's financial outlook had become. Within a year, remaining unrestricted endowment, some $5 million, would be $10 million short of the projected deficit. Bankruptcy loomed. The sale of the University Heights campus was an absolute necessity, he said, both to cut expenses and to obtain capital. This sudden attack of realism was brought about, in part, by the receipt of the report from the Deans' Task Force on the Financial Emergency, headed by Dick Netzer, Dean of the Graduate School of Business Administration. The report recommended a total restructuring of the University into vertical units of the respective undergraduate and graduate schools at Washington Square, and the dissolution of University Heights.

On May 6, the administrations of PIB and NYU began their first tentative talks about merger.

Faculty and student reaction was strident. NYU students organized a rally to oppose the Netzer report. They wanted to replace the Deans' Task Force with a student/faculty/staff group that would have full access to the University financial record so it could propose alternative actions.

A group of 70 faculty and staff, largely from SES, wired State Senators to vote down the Assembly-passed bill selling the SES campus to CUNY for Bronx Community College. Dean Ragazzini of SES agreed to convene an emergency meeting of the faculty.

The SES engineering faculty approached the administration of CUNY, urging a compromise whereby CUNY would operate an engineering college at the Heights campus. CUNY pointed out that this would require an operating subsidy from the State, and that President Hester "has convinced the whole state that the college is unsupportable. How can you expect us to run it now?"

In response to a faculty petition to refuse any part in negotiations with PIB without "full and equal participation" of the faculty, the Administration offered the faculty an observer at negotiation meetings. The Chairman of the faculty group said: "This is the way they are going to cut us up ... without our having a single word in it ... Presidents come and go, and I for one will not let them rule my life; I am more a part of this University than they ..." (May 10.)

He spoke in a moment of high emotion, but he was voicing the feelings of many of the SES faculty -- of deep pride in their school and of desertion

by their administration. The next day, the Senate passed the bill selling University Heights campus to CUNY. The news announcement added that the State would lend the CUNY Construction Fund $13 million as a down payment for the campus, and that Bronx Community College could take possession for the school term of September, 1973.

That same day, the University Senate met. President Hester addressing the gathering spoke bluntly to the question of an additional year for study of alternatives to the closing of SES. "The only alternative is to make next year the last year of the University."

Ad Hoc Faculty Committee

The SES faculty formed an Ad Hoc Committee on May 12, with each member contributing $200 to pay for needed legal services. Its first action was to send a long message to Governor Rockefeller urging his veto of the sale legislation. The appeal gave optimistic projections for an imminent increase in the number of engineering students, and listed the impressive array of superior facilities at the SES campus. These, they asserted, could never hope to be duplicated at PIB, nor would the Brooklyn school be able to absorb all the SES faculty. As alternatives, the group urged an arrangement whereby CUNY would lease back the Heights campus to NYU, or the grant of a subsidy to NYU to continue operation of SES pending study of University financial problems, or the sale and use of some parts of the campus for Bronx Community College and the balance to be used for an engineering school under CUNY auspices, or, finally, the sale of the campus to SUNY for a Major Engineering Center with PIB and other engineering colleges transferred to the Heights campus.

Appeals to the NYU Board of Trustees to disapprove the sale went first by letter on May 17, then in an appearance by Professor John Lamarsh at a Board meeting on May 22. Restating the previous alternatives, the Ad Hoc Committee ended with an appeal, that if all else failed, the SES be transferred to Washington Square campus as "a far better solution than the complete destruction of the School of Engineering and Science."

Out of the welter of proposals and counterproposals, a clear line of fallback was emerging. Ideally, the engineering facility at the Heights would be retained -- under whatever auspices -- and become the focus of major engineering education in the area, possibly including other area

schools and with generous state subsidy. If this failed, and the lack of encouragement from political and University administrative sources made this increasingly likely, then the faculty hoped that SES could be transferred to the Square. The one alternative they were not prepared to consider was merger with PIB at the Brooklyn site.

President Arthur Grad of PIB wanted some projection of the number of faculty and students who would be willing to transfer to Brooklyn. Polytechnic's own precarious finances made a reasonable balance of students to faculty of first importance. His request for a poll of SES faculty to see how many would accept appointments at PIB was rejected by unanimous vote of the SES faculty.

During June, as merger appeared virtually inevitable, the Ad Hoc Committee drew up a proposed merger agreement their lawyer submitted to the NYU administration. In summary, it sought equal treatment with current PIB faculty, carryover of tenure and retirement credits, assurance of research space and facilities equal to that enjoyed at SES, provision of student financial aid for transferees receiving such help from NYU, employment of SES technical staff on any grant research transferred, and an equal voice in the appointment and selection of a completely new administrative arm of the merged institution. The proposed agreement further stipulated that PIB establish its financial ability to carry out the merger plan to assure the faculty that "the proposed institution can, with certainty, look forward to a secure future and adequate provision for the assured performance of contracts with faculty ..."

The strong tone of the demands, and its accompanying letter, angered some members of the administration. One can feel a certain sympathy with President Hester's quandary. Faced with the overwhelmingly bleak financial picture, and looking to the sale of the Heights campus as a means of salvaging and insuring a stable future for the University as a whole, he had to regard the SES faculty proposal as a threat to his whole plan, and the actions of the Ad Hoc Committee as adversary undertakings.

The Ad Hoc Committee received no comfort from a resolution passed by the non-tenured faculty of SES urging complete cooperation with merger efforts and acceptance of employment offers by PIB. Nor were they cheered by a Board of Trustees resolution passed on June 19 calling for the discontinuance of the School of Engineering, the termination of faculty employment by August, and the continuation of merger negotiations with PIB.

Reports of the June 20th negotiating session between administrators for the two institutions were discussed by the SES faculty the following day. Many of the points in the proposed merger agreements were unacceptable to President Grad. He refused to guarantee the hiring of all SES technical staff people, offering them preference only if better staff were not available elsewhere. He emphasized that PIB wanted the principal investigators, pointing out that PIB had terminated 10% of its own research staff the previous year. He was particularly anxious that contracts be signed "by a majority of the faculty of the NYU School of Engineering and Science who represent at least 3 million dollars in research contracts." Tenure was offered only to full professors already holding tenure. The provision of research and office space would be the same as that now being negotiated for PIB faculty with the Brooklyn chapter of AAUP.

The SES faculty reacted angrily. Recommendations ranged from rejection of the contract, through a suit to enjoin NYU from terminating SES, to sending letters attacking President Hester and the Board of Trustees to the newspapers.

It is probably fortunate that much of the communication between the administration and faculty during this period was conducted by Lester Migdal, lawyer for the Ad Hoc Committee. While firmly committed to his clients' interests, he was able to bring about a calm and factual exchange of information between both sides in what was rapidly hardening into a polarized situation. In particular he convinced the SES faculty that the administration could not conduct negotiations with PIB while encouraging SES to move to Washington Square. This would, Migdal pointed out, be highly culpable behavior, and be accurately understood by PIB and by the State as bargaining in bad faith.

The faculty felt that, within economic guidelines laid down by the Netzer Task Force, the SES could be absorbed by the Square retaining a majority of the faculty and research grants, as well as most of the students. Under the circumstances of negotiation, the administration was not willing to consider these arguments.

On June 27 a merger negotiating session of the two administrations took place at the New York offices of the State Education Department. After considerable discussion, with President Grad pressing for guarantees of transfer of SES research grants and principal investigators with their

equipment, and with NYU spokesmen unwilling to commit the SES faculty or students to transfer, or to provide any "dowry" from endowments, a minimum agreement was reached. Final negotiations and merger signing were set for the next month. All through July notes, memoranda and phone calls went back and forth between the Heights and Washington Square without changing the situation in any way. On the 26th, Presidents Grad and Hester signed the merger agreement.

A meeting of the faculty of SES was held on August 3 at which draft letters of acceptance and rejection of PIB's offer of appointment were distributed. On August 21 the SES attorney, Lester Migdal, transmitted the letters to PIB: the result was 85 refusals and nine acceptances.

The SES faculty now felt that the options open to them were more promising. The Ad Hoc Committee held a tentative discussion with a member of the State Education Department on November 1 seeking his opinion on whether it would now be feasible to consider merging PIB into an NYU school of engineering to be operated at Washington Square.

Despite a September 18 statement by State Education Commissioner Ewald Nyquist that PIB and NYU must carry out the merger regardless of faculty resistance, discussions continued on a move downtown. President Hester was quoted as believing that no new merger plans would be considered.

On September 25, the NYU Board of Trustees authorized the administration to plan for engineering courses at the Square campus, and to notify grant contractors and prospective students to this effect. The next few weeks were spent in planning the move to Washington Square. While it was evident that not all of the faculty could hope to be employed there, there was a mood of optimism.

On October 22, Chancellor Sidney Borowitz went to Albany to discuss certification of the new engineering establishment downtown with Education Department officials.

Six days later, the move was rejected. Commissioner Nyquist wrote that a re-reading of the legislation providing for the sale of the SES campus made it clear that "the bill precluded the possibility of NYU having an independent engineering school." The Chancellor and President Hester made a trip to Albany in an attempt without success to get the ruling overturned. It was back to merger negotiations again.

There continued to be planning for NYU's "new" school of engineering, largely by Professor Antonio Ferri, Chairman of the Aerospace research department. But on November 22, faculty committees from NYU and PIB met to begin work on a new plan for merger.

EARLIER PIB STRUGGLES

For nearly a decade prior to the 1973 merger with SES, PIB searched for other mergers and affiliations.

In the Polytechnic centennial year, 1954, the governing Corporation confronted by the need to fine more space, decided to stay in New York City. In this, it was influenced by the municipal administration's intention of providing campus space through urban renewal. PIB bought the American Safety Razor plant adjacent to the proposed renewal site, rehabilitated it, and moved from what had been 15 scattered brick buildings and rented quarters in the Borough Hall area. It worked with nine other institutions of higher education on cooperative planning. Under a small State Education Department grant the Nelson Associates consulting firm produced a report, "Brooklyn -- A Center of Learning" that outlines an ambitious plan. In early 1966 the new City administration, however, stopped the combined urban renewal project while it was awaiting federal approval.

Starting on Christmas Day, 1965, when PIB President Ernst Weber* wrote the then new Chancellor Samuel B. Gould of the State University of New York suggesting their institutions work together cooperatively, PIB officers explored possible relationships with SUNY, Pratt Institute, Mount Sinai Hospital's new medical school, Hofstra and Adelphi Universities, and the City College of New York.

None of these worked out, although some negotiations advanced to stages where detailed plans and even agreements were drafted.

In September 1966 President Weber talked with SUNY Chancellor Gould, who suggested there be a jointly operated SUNY-PIB Applied Research Center. Dr. Weber countered with the idea of an Urban Studies Center. There followed occasional talks about such a center involving SUNY, CUNY, NYU and PIB. From PIB Minutes:

> Talks with Dr. Gould evolved from simple cooperation to contractual association. From the outset, Dr. Gould has expressed great interest in the qualities and capabilities of

*Dr. Weber became the sixth President of Polytechnic after Dr. Rogers' death in 1957, serving until he retired on June 30, 1969. Dr. Benjamin Adler was Acting President until Dr. Arthur Grad took office in August, 1971. Dr. Norman P. Auburn was Acting President from March 12, 1973 until Dr. George Bugliarello became President in October, 1973.

the Institute. He freely discussed the salutary implications to the State and PIB stemming from a close interaction. Subsequently, an Ad Hoc Committee of the Corporation met with members of the Education Committee of the Trustees of the State University of New York. On June 7-8, 1967, Dr. Gould presented the proposal developed by the PIB Administration, and approved by the Executive Committee of the Corporation, to the State University's Board where it also was accepted wholeheartedly. This proposal projected PIB as a State-related university and sets the stage for providing the State of New York with a ranking engineering school and PIB with the tools to realize its full potential as a technological university.

PIB Board Chairman Robert E. Lewis had a telephone conversation with Dr. Gould just before the June 14 Board meeting and received assurance that once a public announcement of the exploration of state university relatedness was made, that this was practically tantamount to actual consummation.

Mr. Lewis then called upon Mr. William F. May, President of the American Can Company and Chairman of the Ad Hoc Committee, who stated that his group, after a thorough review of PIB objectives and finances, had concluded that "growth to excellence" could not be achieved through the normal and private channels of support. In this context and after exploring existing alternatives, talks have been occurring with the State University of New York (SUNY). The Ad Hoc Committee has advised the State that "we do not wish a limited program -- this we can do ourselves." Mr. May volunteered that it might not be beyond the realm of possibility for PIB to achieve an annual budget of $20 million with a campus valued at $100 million in the light of the experience of the University of Buffalo.

PIB, it was envisioned, would become the prestigious Engineering University for the entire State system. The Brooklyn campus would probably be the major campus of the Institute. The Farmingdale campus would be enlarged as a graduate and research facility, with the undergraduate situation to be re-examined. A new campus perhaps in Westchester or the Mid-Hudson area might evolve if this would be most propitious in the long range.

On June 30, 1967 a press release announced the SUNY-PIB agreement in principle. More than ten months and scores of meetings later a May 1968 draft of a SUNY-PIB affiliation agreement with an accompanying proposed creation of a SUNY-CUNY-PIB Center for Environmental Studies emerged. Although SUNY-PIB discussions were to continue without affiliating result, to prevent PIB from going bankrupt a last-minute $1,500,000 State appropriation passed the legislature on May 25, 1968.

The 1967-68 events demonstrate the plurality of factors that attend affiliation between a private institution and public system of higher education.

A few highlights from PIB Corporation Minutes:

7/21 Chancellor Gould tells Dr. Weber he is concerned about negative reaction from the Board of Regents, but expects SUNY Vice-Chancellor Matthew Cullen and PIB Professor Charles Schaffner to continue discussions leading up to a memorandum of understanding.

8/30 SUNY officials Syrett, Porter, Crary, and Segal visit PIB. Meet with Vice President Schaffner, Comptroller Albert E. Spruck, Provost John G. Truxal, and Professor Paul A. DeCicco. Basic problem of communication within SUNY appears evident. It was agreed that Dr. Gould would write President Weber stating SUNY specific commitment, Dr. Porter would check budget factors, and legislation would be prepared.

9/8 Dr. Gould writes Dr. Weber. While SUNY Board had accepted association with PIB in principle, time was needed to bring legal association into being. SUNY Master Plan will have to be modified, with Board of Regents approval.

9/21 Dr. Weber tells PIB Executive Committee that Dr. Gould encountered "considerable static" from Board of Regents regarding the affiliation. Regents are elected by legislature, set State educational policy, hold legislative, executive and judicial power, have jurisdiction over public funds for education, incorporation and revocation of charters, maintenance of standards and accreditation of courses of study in institutions of higher education. The Commissioner of Education serves at their pleasure.

11/21 At meeting of PIB planning committee with State Education Department people Chancellor Gould outlines events needed to arrive at proposal for SUNY Master Plan change acceptable to Regents. PIB must convince the Governor and the Regents that the SUNY-PIB affiliation is desirable. Says that sequence should be to approach the Governor, then the Regents, and then legislators.

Because of an unwritten agreement between the State and City universities not to invade each other's territory, Dr. Weber should talk with CUNY Chancellor Albert Bowker to make sure he is not trying to influence the Regents against the affiliation.

12/18 Dr. Weber sees Dr. Bowker, who confirms that SUNY support of undergraduate education within New York City is not acceptable to CUNY. If forthcoming Bundy report does not solve PIB's critical financial problem, then possible joint CUNY-SUNY support may prevent PIB leaving Brooklyn.

12/20 Commissioner James E. Allen, Chancellor Gould, and Dr. Weber meet in Albany. Lack of progress on SUNY-PIB affiliation attributed to delayed release of Bundy report. Board of Regents cannot take action on case of one institution until after it considers Bundy report at 2/6 meeting.

2/1 Bundy report released. It recommends grants to private colleges on a per student basis. As expected, recommendations do not solve PIB financial crisis.

2/9 After discussions with Drs. Gould, Allen, Bulger and McCambridge of the State Education Department, Dr. Weber again sees Chancellor Bowker who welcomes idea of PIB establishing a new campus in the HUD area of Brooklyn, near the Long Island Railroad's Atlantic Avenue terminal. Gift of present PIB plant can make possible a large graduate education complex jointly operated by SUNY-PIB and CUNY.

2/15 Associate SED Commissioner Bulger agrees that annual State support to PIB in Cullen-Schaffner proposal should rise to $2,500,000 for current year and $5,250,000 for coming year. After learning of Bowker reaction, Commissioner Allen is ready to consider SUNY-PIB affiliation desirable; questions still to be resolved are how to change the SUNY Master Plan; how private sectors of education will react, to avoid subsequent problems for the Regents, and what legislative measures are needed.

2/16 Dr. Weber writes Dr. Allen on critical PIB situation and urgent need for Regents action.

3/5 PIB Corporation member Walter Rothschild says NYU Chancellor Allan Cartter strongly against SUNY-PIB merger resulting in reduced tuition.

3/7 Alton Marshall, Secretary to Governor, sees PIB Chairman Lewis, President Weber, and attorney Roswell Perkins. Speaks of the Governor's strong direct interest and pressure for progress. Chancellor Gould and Vice Chancellor Ernest Boyer see them afterward; Gould hesitant to move without CUNY Chancellor Bowker's concurrence, but agrees to projected new PIB Brooklyn campus and Applied Research Center Bowker liked.

3/12 Commissioner Allen says "Regents' Objectives" in proposal is satisfactory, that after SUNY board passes resolution favoring affiliation it can be announced with understanding Regents must still approve.

3/13 CUNY Chancellor Bowker meets with Messrs. Gould, Weber and Perkins. Wants agreement on CUNY and SUNY sharing joint Urban Environmental Studies center costs, PIB to furnish engineering faculty. Bowker proposes SUNY-PIB affiliation restrict financial support to graduate study.

Any competence PIB had in dealing with State legislators and officials in the executive branches of State Government was acquired by trial and error in the course of experience from Spring 1968 on:

4/4 CUNY Chancellor Bowker tells A. Marshall and R. Perkins he opposes SUNY support of undergraduate work in Brooklyn and wants two Board nominations to come from CUNY.

4/16 SUNY Chancellor Gould writes "broadly worded" letter to SED Commissioner Allen suggesting a study of SUNY-PIB affiliation.

4/26 Commissioner Allen replies that upon directive by Regents the SED will make a state-wide study of engineering education. Although the Regents are well aware of Polytechnic's quality they see no legal basis for making a grant to it.

PIB Chairman Lewis talks with Mrs. Maurice Moore, newly elected Chairman of SUNY Board, stressing urgency of the affiliation agreement. She says Governor Rockefeller is enthusiastic about it.

5/14 Mrs. Moore tells Mr. Lewis Chancellor Gould has made specific 5/11 proposal to Commissioner Allen. Said SUNY is tight on money. Some SUNY Board members will see the Regents.

Commissioner Allen says Gould submitted amendment to 1964 SUNY Master Plan to discuss with "Brooklyn Polytechnic Institute the various possibilities of affiliation including the development of increased graduate engineering opportunities; the creation, in conjunction with City University and Brooklyn Polytechnic Institute, of an applied science center with major responsibility for investigating scientific and technological facilities and programs appropriate to the needs of students and adults." Dr. Allen hopes to get a definitive statement PIB can use to borrow money from a bank.

5/15 A. Marshall advises R. Perkins next three days critical for supplemental budget request. At 10 pm Governor's request is located by Assembly budget committee.

5/20 R. Perkins advises that SUNY appropriation request for $2,500,000 went to Bureau of Budget, which communicated it to Governor's office.

5/23 Dr. Weber learns that Assembly Bill 7185, "Polytechnic appriation," calls for $1,500,000. Passes legislature as last item in evening. Worded as payment to SUNY to meet part of PIB operating expenses in anticipation of possible contractual relationship.

6/6 Dr. Weber reports to PIB Executive Committee that Chancellor Gould assured him of anxiety to forge ahead, but Board of Regents was delaying progress. PIB Faculty Conference Committee presents resolution requesting formation of an ad hoc committee "to assist the President in all steps of the negotiations with SUNY."

6/7 Dr. Weber writes Dr. Gould nominating Drs. Schaffner and Truxal to work out concept of joint environmental research center with SUNY and CUNY representatives.

7/1 Dr. McCambridge advises that Dr. Frederick Terman had been engaged to conduct Regents study of Engineering Education in New York State. Expresses feeling that appropriation has "turned the corner" and is "major breakthrough."

7/3 Dr. McCambridge says Terman report deadline is December 1, 1968. Feels that PIB-SUNY affiliation "can then be wrapped up in two months."

On July 7 SUNY Chancellor Gould appointed an Advisory Committee on Engineering Education to advise him on the rationale for and structure of a relationship between the State University and PIB. It consisted of representatives from the various SUNY campuses and was chaired by F. Karl Willenbrock, Provost of the SUNY-Buffalo Faculty of Engineering and Applied Sciences.

7/23 SUNY Board members meet with PIB Corp. ad hoc committee. Focus on progress of affiliation, particularly funding. SUNY budget to be made final in December. Dr. Gould will have to defend PIB before legislature after forewarning Budget Director Norman Hurd. Dr. Gould would prefer that PIB persuade CUNY Chancellor Bowker to allow affiliation; because of CUNY objections, only a contract relationship is feasible.

Ad Hoc PIB Faculty Committee and Dr. Weber meet with Dr. Gould and SUNY Executive Dean Ernest Boyer at SUNY New York office. Dr. Gould states "We have progressed far beyond mere agreement in principle," he is certain details will be worked out and further support through the SUNY budget will be forthcoming in the interim.

9/24 Dr. Boyer assures Ad Hoc Faculty Committee of PIB that SUNY is anxious to move ahead, but CUNY is obstacle and Regents must make first move. Situation would be much simpler if PIB or at least its undergraduate program moved out of the City.

Negotiating committee meets with 12 SUNY representatives. Agree that PIB support for 1969-70 be a direct state budget

item, and faculty-to-faculty planning of academic programs begin with 2/1 terminal date.

9/26 PIB Executive Committee frames resolution to be submitted at 10/24 annual meeting, authorizing plan for transfer of all undergraduate teaching out of the City if it is impossible for SUNY to support it in New York City, with a transition period to avoid hardships on undergraduates enrolled now. To be sent to Messrs. Marshall, Gould, Allen, Bowker, and Mayor Lindsay.

10/8 Mr. Lewis reported that the National Science Foundation said it is favorably processing the PIB application for Science Development Program grant extension. NSF would like Chancellor Gould to write in support, stating the nature of the affiliation, what it will mean, its schedule, assuring that SUNY will continue PIB with SUNY approval of the NSF activities.

Dr. Gould is willing to write the letter with appropriate safeguards. The SUNY Board has asked him to write Commissioner Allen that PIB needs resolution of its problem, and the most logical solution would be affiliation with CUNY. Dr. Gould doubts that CUNY will agree because of lack of funds, "but it will bring the subject into the open and give CUNY the opportunity to agree or disagree, in which event the Regents can go ahead with SUNY affiliation negotiations."

Toward the end of the meeting a call from Dr. Gould to Mr. Lewis. He said his letter to Dr. Allen recommending PIB seek affiliation with CUNY had stipulated that Chancellor Bowker have until 12/1 to make a decision. If there were no response by that date Dr. Gould would move ahead with full merger negotiations.

PIB negotiations for affiliation with SUNY went on for three more years, until late 1971. By that time two successors to President Weber had dealt with Dr. Gould's successor as SUNY Chancellor, Dr. Allen's successor as State Education Commissioner, and Chancellor Bowker's successor at CUNY. There was a succession of proposals that PIB found unattainable when they were problem-solving or unacceptable when offered. In the course of these years these collisions of interests were evident:

1. The State

As SUNY suffered budget retrenchment, institutions within it opposed affiliation with PIB on the ground there would be less money for their operating and capital needs. The central SUNY administration hoped that funding for PIB would not come out of its budget, but through appropriations

channeled through the Regents, State Education Department or directly from separate legislative action.

The Regents and SED felt that they must exercise a discipline over whatever affiliation or merger were determined.

Some developments that were desirable on their own merits took place as delaying actions when either the Regents or SUNY found reasons to delay or avoid decisions. The Terman study of engineering education in the State was worthwhile; it happened because the Regents hesitated to approve merger without learning of its impact on other private institutions. The Willenbrock study into feasibility of creating a single technological university in the New York metropolitan region was worth doing for its own sake, but occurred because various SUNY engineering schools feared a SUNY-PIB.

2. CUNY

Successive chancellors of the City University opposed SUNY-PIB if that meant rival public engineering undergraduate education within City limits, but showed interest in cooperation with PIB and SUNY on jointly conducted graduate research.

3. Private institutions

After NYU President James Hester's initiative resulted in "Bundy money" given by the State to private higher educational institutions, he tried to get the Governor's help for SUNY purchase of the University Heights campus with preservation of SES there. He and NYU Chancellor Cartter mobilized other private engineering schools' concern after the first special State appropriation to PIB.

SUNY, CUNY, and private institutions all faced a common dilemma in decline of engineering enrollments with more combined capacity to produce accredited engineers than there were students. All had sharply reduced income, too, in research cutbacks. The prospect of lowered tuition at PIB threatened them.

Their concerns were all part of an effort to find acceptable mechanisms whereby professional education could obtain more State funding, as had been worked out for medical schools. As the rate of increase in federal funding tended to diminish in the late Lyndon Johnson and early Nixon years, with many more institutions dividing a limited amount of

federal support, such other sources of income as student fees, foundation grants, and private gifts did not keep pace with institutions' needs. PIB, SES, and others were trying separately and, in some instances together, to tap the State. Engineering education had not made its case for priority attention in Albany, except where constituents demanded it for PIB.

The October 24, 1968 PIB Corporation meeting passed the resolution authorizing transfer of undergraduate programs if it were to prove impossible for SUNY to support them within the City.

By November 30 Provost Willenbrock reported to Chancellor Gould as chairman of a working SUNY-PIB faculty group studying academic aspects of the projected relationship.

Willenbrock's report had not been circulated to the working committee until he transmitted it to Dr. Gould. Its summary "endorses the recommendation made by the Advisory Committee on Engineering Education (ACEE) and approved by the State University Central Staff that every effort should be made to maintain PIB as an educational resource of the State." Its recommendations stated that if PIB were to become part of the SUNY system and retained its "entity as an individual institution" it should be located in the metropolitan New York area. Although the working group did not choose from among possible "coupling mechanisms" the report recommended immediate appointment of an inter-institutional Board "to undertake a systematic and detailed development of the plan for integrated operation. Special attention should be paid to transitional problems."

Minutes of the PIB Executive Committee, Corporation, and Faculty Senate indicate that the remainder of 1968 and all 1969 would be marked by persistent representations to whomever in the State government might advance SUNY affiliation:

2/27 With severe cut in SUNY budget, Regents vote to take $3 million from it and put this into State education budget to be sure PIB gets it.

3/14 The State Education Department outlines tentative proposal to PIB Ad Hoc Faculty Committee in Albany, concentrating on minimum amount of financial help needed to keep PIB functioning as a separate entity. It would establish a third category in the public sector of higher education in the State that would be publicly supported and under Regents jurisdiction. Support would be between four and five million dollars a year, to be re-evaluated at end of five years.

3/21 Faculty Committee issues critique of SED tentative State-relatedness plan because it has no provision for an academic environment leading to greater quality. Committee tells Chairman Lewis that only solution to PIB problem is full merger with SUNY through the Governor's pressure on Chancellor Gould. The Governor insists he will not become involved politically or financially, however, preferring to have Regents first make their judgment on this academic matter in form of a recommendation to him.

3/27 PIB had demonstration in front of State Capitol. Small groups visit individual legislators. Compliments for student and faculty deportment. That night, $3 million item for PIB is struck from State Budget.

3/28 Board of Regents makes strong statement supporting PIB, and issues the Terman report. It praises PIB highly, calls for State support, and makes specific criticisms of PIB operation. Action Committee advised "a major drive" needed to restore appropriation to Supplementary Budget. Vice President Schaffner chosen to organize it with Drs. Helmutt Juretschke and Harry Hochstadt as lieutenants. Jack Titus retained as Albany representative.

4/24 Messrs. Weber, Schaffner, Hochstadt, and Juretschke go to Albany. They stay there until 5/2, meeting with Governor Rockefeller, Budget Director Hurd, and every legislator who will listen.

5/2 Supplemental Budget provides interim $2 million for PIB through the SUNY budget pending affiliation with SUNY, CUNY, or Regents plus $496,000 in "Bundy money" in Department of Education budget.

5/9 Vice President Schaffner, Drs. Juretschke and Hochstadt summarize status of relationship with the State. Governor supports affiliation with SUNY, opposes Regents' plan, and Bowker's position. Legislative leaders oppose Regents' plan. Former SED Commissioner Allen has informed Governor and Regents of his changed position and support for SUNY-PIB affiliation. Acting Commissioner Nyquist says he will not oppose change in Regents' position. Vice Chancellor Boyer says SUNY is prepared to proceed if Regents approve.

6/4 First of 34 reports on "Operation - SUNY" issued up to 4/20/70 on verge of next Supplemental Appropriation that brings PIB $3 million.

On November 14, 1969 Vice Chancellor Boyer and SED Assistant Commissioner Couper drafted a contract with SUNY providing $3 million for PIB; development of a SUNY-PIB collaborative engineering education

program for short-range, intermediate, and long-range future, a PIB Master Plan, committee of academic visitors, and quarterly and annual reports of both a financial and academic nature. After Committee on Higher Education debate on the 19th and full Regents debate on the 20th and 21st the Board of Regents rejected this. Instead it directed the SED staff to prepare a contract it would administer and to prepare a study document on appropriate long-term organizational arrangements for administering such public funds. On January 20, the Governor's budget called for $3 million to be provided to PIB in 1970-71 through SUNY.

When the legislature passed the budget on March 26, 1970 it deleted this item. SUNY submitted a statement to Dr. Norman Hurd, State Budget Director, asking for its restoration -- yet again -- in the supplemental budget. Professors Hochstadt and Juretschke went to Albany on April 18. They saw Messrs. Douglas and Shostal in the Governor's office; Senators Bloom, Conklin, and Stafford; Assemblymen Bartlett, Battista, Dowd, Gunning, Kelly, and Strelzin, and Mr. Roberts of the Ways and Means Committee. Restoration was accomplished. An agreement signed by Dr. Boyer and PIB Acting President Benjamin Adler on July 8 confirmed terms of payment under this third State appropriation to PIB.

Acting President Adler and President Emeritus Weber met in early June with President James M. Hester and Chancellor Allan M. Cartter of New York University, who expressed their intention to block the proposed SUNY-PIB merger. They felt that all other engineering colleges objected to it, and proposed instead a plan for state aid to them all. Rather than incorporate PIB into SUNY at a cost Terman estimated would exceed the Cresap, McCormick & Paget estimate of $55.6 million in five years, plus capital costs they reckoned at $35-50 million "just to save one institution... to merely maintain the status quo in engineering schools and enrollments" an NYU paper drafted by Paul E. Bragdon, Vice President for Public Affairs who was the architect of the Bundy Plan and has since become President of Reed College, asked "what might it [the State] be willing to spend to dramatically strengthen all private engineering schools in New York?"

NYU proposed a Board of Engineering Science Education, basic support grants, and consolidation of engineering education in the New York metropolitan area. They estimated costs would require operating funds rising from $13.45 million until $20.35 million in the program's fifth year,

and capital funds that would improve from $5 million up to $15 million per year.

As an alternative to the SUNY-PIB merger, Drs. Hester and Cartter suggested a Polytechnic-NYU merger. Drs. Adler and Weber could not under the circumstances see justification for such cooperation because "both academic entitles are so [financially]* ailing." The NYU officers implied that their approach had the Governor's backing or sponsorship. Dr. Weber later checked through reliable channels and found the implication mistaken.

On June 13 Professor John G. Truxal reported to Acting PIB President Adler his reactions to the NYU meeting.

> "... there was much discussion of the proper tactics for the group to use (whether and how to approach the Governor, the Regents, etc.) and the bases upon which special support for engineering could be justified ... The group was apparently unanimous in the desirability of attempting to convert the PIB situation to one in which they all would benefit markedly. NYU stated its deficit from engineering alone this year was one million (of a total university deficit of 4.5 million); apparently other schools faced roughly analogous figures. Columbia's representatives stated flatly that they would support any plan which meant significant amounts of money for Columbia. There was very little discussi on of whether the money would actually improve engineering education (this seemed to be a relatively minor matter, at least with many of the representatives). Schultz of Cornell and his vice provost Kennedy were the only ones who seemed to be conscious of academic considerations and statewide goals...
>
> "... the proposal presented by Cartter and Hester has several very attractive features, which we should recognize:
>
> (1) The total monies involved are no more than would be needed for PIB alone with a merger, yet theoretically all private univer sities would be helped and (at the same time) PIB's strengths and contributions would be preserved and assured.

*It is significant to note, however, that throughout this period both PIB and NYU-SES continued to carry on productive teaching and research programs. Even while their administrations and faculty committees took part in efforts to find answers to rising deficit operations, there were full schedules of undergraduate and graduate courses; there were scores of research reports read at professional meetings and published in professional journals, numerous books appeared, and leaders in their fields were in demand as invited speakers at conferences in this country and abroad.

(2) The program parallels that already approved for medical education, and hence does not represent an entirely new approach to state support of private education.

(3) The program would preserve the 'sanctity' of CUNY within New York City, and hence might win enthusiastic support from Bowker.

(4) The program brings in the most powerful (politically) schools in New York and allows the legislators to do something directly for their constituents.

"There are several monumental weaknesses in the plan, but these are very cleverly hidden . . . :

(a) The proposal attempts to avoid the concept of a giveaway of state funds without any return by promising the creation of a Board which would control the expansion and development of engineering education at the private schools . . . most of the representatives . . . seemed to assume that it would be no more effective than the present Department of Education in controlling the private schools. . .

(b) There was no serious consideration at all of coordination with SUNY or CUNY. If the master plans of these institutions should be carried out, the excess capacity currently existing in engineering education would be enormously increased, with growing troubles for the private schools . . .

(c) The way the Board would operate in practice is most difficult if not impossible to visualize, but this was dispensed with lightly.

(d) There is no real justification of the public support of engineering education in the private schools. Indeed, the feeling present seemed to be that PIB's activities over the past few years made this possible and they should grasp the opportunity when it is presented. Later, they could turn to the sciences, education, management, and other fields. . ."

We were able to disinter six draft plans or proposals made during the balance of 1970, only the last making any impression on Albany:

12/21 A Proposed Relationship between PIB and SUNY, submitted by SUNY to the Regents, the State Budget Director, and the Chairmen of the Senate Finance Committee and Assembly Ways & Means Committee.

Comments are on five merger models: PIB as a contract institution, as a free-standing unit of SUNY, merger with Downstate Medical Center, as an extension of Stony Brook, and merger of PIB graduate engineering into Stony Brook.

> Conclusions and Recommendations were to proceed with the 5th model, merging PIB graduate programs and its Farmingdale Center into SUNY-SB, noting possibility of an undergraduate program remaining at the present Brooklyn location as a private institution, and recommending adequate interim financial assistance to PIB in the 1971-72 budget.

Louis N. Rowley, Jr., the new PIB Corporation Chairman, in a special January 4 edition of the Faculty News, urged faculty, staff and students to reserve judgment with respect to the proposed "merger" plan, assuring faculty and staff there would be no drastic changes while this proposal and its alternatives were being considered.

In February a committee of nine PIB professors headed by Dr. Juretschke decided to seek political action to save PIB again. On the 5th, Brooklyn Borough President Sebastian Leone wrote Governor Rockefeller a two-page letter. In it he said that a PIB-SUNY affiliation,

> "properly effectuated, would give stability and strength to one of the most valuable educational resources in the nation ... Unfortunately, however, a proposal has recently been advanced that would soon dismember and eventually destroy this creat citadel of science ... Such a proposal is ill-conceived and is obviously based on a complete misunderstanding of the functions, operations and achievements of the Polytechnic Institute ..."

Four Brooklyn, five Queens, and two Staten Island members of the State Assembly wrote Governor Rockefeller with copies to SUNY Chancellor Boyer opposing transfer of PIB graduate programs to Stony Brook. The Faculty Action Committee marshalled representations to other Assemblymen by PIB people living in their districts.

In March State Senator Samuel L. Greenberg, Chairman of the Senate Finance Minority Committee, had his staff draft a plan to merge PIB into CUNY as a "free standing" institution. The detailed plan, fashioned by a team headed by Julius Venner (Senate Minority Finance Counsel) forecast many of the issues debated prior to the two agreements for merger of PIB with NYU-SES three years later. It would transfer the entire Brooklyn plant and equipment to CUNY for one dollar; make the PIB Corporation an advisory board to the City's Board of Higher Education with power to establish a PIB Foundation controlling income from PIB endowment for benefit of the PIB Center of CUNY and provide a vehicle for research income;

sell the Farmingdale Graduate Center to SUNY for an estimated $4,185,000; use the proceeds to develop a graduate and research center in metropolitan transportation at the PIB-CUNY center in Brooklyn and pay cost of extraordinary expenses necessitated by the transfer; continue the Farmingdale Center for continuing graduate education and research at SUNY Stony Brook, transferring full-time graduate students to the Brooklyn campus.

Although President Adler was advised that both SUNY Chancellor and CUNY Chancellor Bowker agreed to the Greenberg plan in principle, in April Provost James J. Conti -- in his capacity as chairman of the Corporation-Administration-Faculty ad hoc committee - informed the Executive Committee that CUNY rejected the first version of the document, preferring a more gradual approach along lines of the Mount Sinai affiliation* with perhaps 1975 as a target date for full merger without tuition. After several revisions there was an April 21st version, with a phased arrangement starting with fiscal 1972 when PIB would be supported under the supplemental State budget with no call on the city or CUNY for money.

The June meeting of the Faculty Senate heard Dr. Juretschke report on the $3 million supplementary State appropriation and Dean F. Marshall Beringer that CUNY Chancellor Bowker had signed a letter of intent to support PIB's State budget request for 1972-73. After review of lack of progress on contract negotiations between the Administration and the AAUP Chapter that had been certified as bargaining agent for the faculty at an election conducted by the State Labor Relations Board on June 2, 1970, Professor Edward S. Cassedy, Jr. of the Electrophysics Department made a motion upholding the principle of tenure in the face of attacks by trustees of universities and legislative bodies. It passed, as were decisions to inform the PIB administration that the faculty felt ill informed on planning affecting the future of the Institute and it wished to take part through its representatives in such planning and in negotiations with public officials.

The July 8 session of the Corporation heard Acting President Adler report that the new SUNY Vice Chancellor G. Bruce Dearing "conveyed the

*The Mount Sinai School of Medicine and City University of New York agreement dated July 31, 1967 stated "mutual promises" on establishment of a common academic calendar and combined academic programs, Mt. Sinai faculty participation in CUNY committees and councils without being considered employees of the University, neither party having responsibility for expenses and fiscal affairs of the other, and while both parties intended to make the affiliation permanent it could be terminated after two years' written notice by either party.

definite feeling that Chancellor Boyer and his entire staff took full responsibility, as mandated by the Legislature, to work with PIB for the Institute to be entitled to the $3,000,000 in the SUNY budget. Dr. Dearing felt that something very definite could be worked out on a four-way basis, and that he would try to set up a meeting with the State Education Department, SUNY, CUNY and PIB to decide not only how to keep Poly going, but to determine the overall engineering education problem in New York State and the metropolitan area.

Corporation Chairman Rowley announced on August 5 the appointment as seventh President of PIB Dr. Arthur Grad, Dean of the Illinois Institute of Technology Graduate School, effective immediately. At the September 16 Corporation meeting Dr. Grad stated that the high cost of the SUNY-Buffalo merger had made the State "overly cautious" in working out an affiliation with PIB. He felt that the way the legislature had appropriated $3 million was "particularly unfortunate." Chancellor Boyer interpreted the law to mean that before PIB was entitled to any funds there must first be agreement on a plan to transfer certain faculty members and sell the Farmingdale Graduate Center to SUNY. There was consensus at the meeting that PIB could not survive in Brooklyn without a graduate program.

At the September meeting of the faculty Associate Professor of Economics Lester O. Bumas reported on the faculty Ad Hoc Committee's meeting with the new President, who said: (1) in accord with legislative directive, SUNY Stony Brook would absorb a small fraction of PIB staff and programs over a five-year period; (2) CUNY was reluctant to become involved with PIB engineering programs, and (3) PIB may have to make it as a private institution; it must institute suitable economies, but will continue to push for any kind of merger.

The next three months, up until the end of November, 1971, saw PIB sweating out SUNY terms before it could get the $3 million released. SUNY at Stony Brook submitted a plan. The PIB Corporation Minutes reports that it called for transfer of "approximately fifty" PIB faculty members to Stony Brook over the next three to five years, sale of the Farmingdale campus to SUNY, and PIB's cooperation in approaching the legislature for an appropriation to SUNY that would (a) pay salaries of transferred PIB faculty; (b) fund the programs to be taught; (c) pay for the Farmingdale campus, and (d) build an $8.7 million engineering building at Stony Brook. Another clause in the proposal precluded PIB from ever again seeking State funds.

The provisions for PIB's "cooperation in approaching the legislature" had an assumption that PIB possessed political backing that could accomplish these objectives. The stipulation that it forswear asking for money on its own behalf from the State equated PIB costs to the State as a drain that had to be stopped.

Dr. Grad pointed out that under the plan Stony Brook would acquire $2 million worth of research for which PIB would get no compensation. While PIB would be buried, the State would incur higher costs that would be hidden in the total SUNY appropriation.

Release of the $3 million became contingent on the consummation of an agreement between SUNY and PIB. A Memorandum of Understanding dated November 30 was signed in December and approved by a majority voice vote of the PIB Corporation. It still needed SUNY Trustees' approval. Dr. Grad succeeded in having deleted the promise that PIB join in seeking money from the legislature for additional buildings at Stony Brook, and a statement implying the agreement would solve all PIB problems. He also insisted that the names of faculty to be offered SUNY positions, including many of the most distinguished PIB people, be deleted.

The SUNY Board ratified the understanding a week later. SED Deputy Commissioner for Higher Education T. Edward Hollander defended it before the Regents, stating that estimates of enrollments and research income looked toward reduction of the PIB deficit by about $1 million annually for the next three years. In January, 1972 Dr. Juretschke reported to the PIB faculty that the Regents wrote the Governor, favoring release of the $3 million.

At the January 12, 1972 meeting of the Engineering Task Force, part of the Regents Advisory Council on Regional Planning chaired by NYU University Heights Provost W. Lewis Hyde, a paper outlining a suggested approach to engineering education in New York City was passed out. Said to have been prepared by Dr. McCambridge of the State Education Department, this excerpt from a larger document advocated the consolidation of education in engineering on the NYU Heights campus. It had been discussed at the Regents meeting in December that dealt with the PIB appropriation.

Termed the "Hyde proposal," this tabulated the deficits of six private engineering institutions in New York City. The deficits totaled $8,153,000 for 1970-71. Not counting Columbia University, it proposed a Metropolitan

Engineering Center that would serve current upperclass undergraduate and graduate full-time equivalent engineering enrollments at the other five private schools as well as City University. These totaled 5,752. The core of the faculty would be made up of engineering faculties from the institutions taking part. There would be no humanities or social science departments. Ten primary engineering fields and seven extensions of basic studies were suggested. Representatives of the institutions and a limited number of persons appointed by the Mayor and by the Governor would be a joint policy board.

The proposal "suggested that the Heights campus of NYU should be acquired at a full and fair value," then leased back to NYU for one year of transition and detailed planning, the purchase to be funded that year with bond anticipation notes. After that either the City University Construction Fund or the State Dormitory Authority would issue bonds. The PIB plant would be available for such other educational use as the New York City Community College across the street. Transfer of 1,500 students from City University would make available space for other students in the crowded City College facility. A sample budget estimated $23,980,000 income and $22,656,000 expense.

On March 24 PIB issued a counter-proposal for A Consolidated Engineering Center in downtown Brooklyn. This pointed up eight advantages. Under the heading Economy it stated that "There would be no need for the State to purchase a campus for the proposed engineering center because the campus of PIB would be available at no cost for this purpose." If the plan would be put in effect in time for the 1972-73 academic year the added public cost would be about $2.5 million plus a modest amount for moving some laboratory facilities, with decreasing amounts in succeeding years as enrollment approached the desired level of 4,800 to 5,000. There were projections for that many FTE students by 1977, with 189 engineering and 191 arts and sciences faculty at ratios of 15:1 and 10:1. Financial analysis compared PIB, NYU, PIB + NYU, and Combined Institution (visualized as having 5,700 students from among PIB, NYU, Cooper Union, Manhattan, and Pratt, plus 1,500 from CUNY) itemized revenues and expenditures. The sum of the two existing schools' deficits was $4,635,000. The Combined Institution's first year deficit was to be $980,000. With a $3 million State appropriation there was to be a first year surplus of $2,020,000.

On May 25 the PIB Executive Committee heard about difficulties in the first round of merger negotiations with NYU. The June 1st Corporation meeting heard more. Dr. T. Edward Hollander, SED Deputy Commissioner for Higher Education, had chaired three weekly meetings convening three representatives and a faculty observer from each institution. NYU had refused communication with its engineering students, and Dr. Hollander suggested that a team of outside experts be brought in to gather data and make recommendations. President Hester had attended only one meeting.

An offer to reimburse NYU for undergraduates who transfer met little enthusiasm. The NYU administration objected to a letter the PIB Director of Admissions had sent to area high school counselors emphasizing that the legislation called for merger by July 1st.

Dr. Weber thought that inasmuch as the Corporation had the eventual responsibility for whatever happens it might have been wise to appoint a group of trustees to provide some guidelines to Dr. Grad and counsel him in the negotiations. It was unanimously agreed. Chairman Rowley appointed four and agreed to chair this one more Ad Hoc Committee personally. On June 6th the group issued the following Statement of Intent:

1. A merger between the New York University School of Engineering and the Polytechnic Institute of Brooklyn presents both institutions with an opportunity of challenging proportions -- building an engineering center of excellence and stature the New York metropolitan area has long needed but has not yet achieved.

   In an early confrontation with an unparalleled area of problems growing out of urban concentration such a center offers striking opportunities for developing technological solutions by the combined efforts of groups already skilled in such problem solving. And as our economy regains its normal progress and resumes its trend to more intensive application of technology, the center will be a source of enormous potential to industry and government not only in the metropolitan area but in the state and across the nation.

2. To realize the possibilities inherent in a joining of forces by the New York University School of Engineering and Polytechnic implies a full merger of the resources of both -- faculty, students, educational and research programs. The negotiators should be guided by this general principle and seek negotiations to bring about such a full joining of forces, bearing always in mind that the major resources are faculty and students whose right to freedom of individual decision must be respected.

3. To bring about an effective merger of the resources of two institutions requires ample information about the assets each brings to the joint venture -- people, equipment, projects. The Corporation authorizes the Polytechnic negotiators to contribute freely and fully to such a necessary pool of information.

4. The Corporation is aware of and sympathetic to a need for developing answers to the many detailed questions involved in such a merger of human and facility assets, but it trusts that early preoccupation with details will not be allowed to obscure the vision of the opportunity this joining of forces presents, or to deter cooperative planning now so essential to develop long range goals. For all involved -- both institutions and individuals -- there are risks just as there are risks in standing pat. The Corporation believes that the opportunities here are of such magnitude as to clearly outweigh the risks and will demonstrate its feeling by vigorous prosecution of the negotiations leading to an outstanding engineering center embodying the combined resources of the New York School of Engineering with the Polytechnic Institute of Brooklyn.

Presidents Hester and Grad signed the agreement dated July 26, 1972. It is in Appendix A. Some of its provisions differ significantly from the final merger agreement that succeeded it the following March.

THE NEGOTIATIONS

What factors in the final set of NYU-PIB merger talks were special to the instant situation, and what other factors may be of possible use to other institutions entering merger discussions?

The fact that this merger was mandated by law with State money held out as carrots -- sale of the University Heights campus at $80+ millions and continuation of what had become a $3 million subsidy to mitigate the PIB deficit for at least one more year -- was special. So was the fact that one faculty had vetoed an earlier agreement.

Potentially more applicable are that job security soon took precedence over planning of academic programs, with collective bargaining considerations inextricably intertwined with decisions on merger; governance of the merged institution received priority attention, and projection of income from anticipated enrollments and research crossover visualized balanced budget within a time frame that has since been castigated as over optimistic, unrealistic, and madness.

When 85 out of 94 SES faculty refused the PIB invitation to join the merged institutions, the July 26, 1972 agreement signed by NYU and PIB presidents was dead. State Education Commissioner Ewald D. Nyquist wrote Governor Rockefeller advising him of this abortive result.

The SES Faculty Ad Hoc Committee contemplated going to court with a suit petitioning delay of the University Heights campus sale until NYU found ways to move SES to Washington Square. The late Dr. Antonio Ferri, Vincent Astor Professor of Aerospace Sciences, argued against "going that route." He, who had been on the PIB faculty from 1951 to 1964, said that any such action would prove futile and it would be wiser to take part in resumed merger talks with the objective of salvaging utmost benefits for SES programs and people. Professor Ferri asserted that PIB had such powerful influence in Albany it could insure the overturn, through new legislation, of any court judgment that SES faculty might manage to get.

State Education Commissioner sets terms of new merger talks

Lester Migdal, attorney for the SES Ad Hoc Committee, sought to have the State Education Department convene a second round of negotiations. On November 20, 1972 SED Commissioner Nyquist sent a four-page letter to Presidents Grad and Hester. His office received more than usual help in

its preparation. One former SES professor recalls a meeting in the imposing Regents Chamber in Albany, at which attorney Migdal dictated an entire draft text without consulting a note. A former PIB professor remembers how the attorney for the Polytechnic AAUP Chapter had been on the telephone to Albany over a six-week period. The letter mentions Commissioner Nyquist's proposal to intervene "after discussion with the parties involved, with representatives of the Governor and of the Legislative leaders, and after consultation with the Board of Regents."

A basic difference between the new and former talks was his charge to the faculties as well as the administrations of NYU-SES and PIB "to design a new institution that draws upon the academic strengths of both faculties." His next sentence, asserting that "Such an institution, if it is to be successful under private sponsorship, must seek to meet new engineering needs with new and realistic educational strategies," saw further ahead than the deadline the legislature had set for a balanced budget.

The proposed discussions were to be under his direct supervision, conducted by six representatives of each institution, three selected by each board of trustees and three by each of the two faculties. The negotiating committee was to define the process and agenda for discussion, subject to his approval. The faculties of the two institutions were "to be equally regarded." Cost of the negotiations was to be borne equally by the institutions.

Terms of the merger should cover, he wrote, three matters:

(1) merger of appropriate educational and research programs and such faculty of NYU-SES as may be necessary with PIB.

(2) strengthening engineering and other PIB programs through an orderly process of consolidation to assure the academic and financial vigor of the merged institution and the enhancement of its position as an engineering school of national reputation.

(3) consideration of the possibility of establishing PIB as an affiliated engineering school of NYU, operating primarily at a Brooklyn campus, but also offering such programs as may be necessary in Washington Square and other locations.

He asked that neither institution change faculty and administration compensation or tenure status without his prior approval after acceptance of his letter and until execution of a merger agreement.

The AAUP Chapter was to be the sole bargaining agent for the PIB faculty, instructors, and professional librarians, with all agreements then in force recognized in the merger discussions. He did "not intend that merger negotiations substitute or suspend the collective bargaining process."

If the four parties were to fail to agree or ratify the agreement by March 15, 1973, each party would submit the form of agreement it considered reasonable if he were to attempt to resolve disputed issues through mediation. He planned to call on the Regents Advisory Council on Engineering to designate three consultants from the academic community agreeable to a majority of the negotiating committee.

In anticipation of the merger, he pointed out that the negotiating teams could agree to temporary transfer of SES programs to PIB.

The two presidents promptly signed copies of the letter signifying their assent to its terms, on November 21. The very next day the negotiating committee of twelve held their first meeting.

T. Edward Hollander, SED Deputy Commissioner for Higher Education, recently said in retrospect that these negotiations surprised him in two ways. The four parties each separately took adversary positions at various times opposed to the other three, rather than dividing between SES and PIB sides. And it proved far more difficult to obtain agreement than the SED had expected. On November 27 Dr. Hollander sent a memorandum to Commissioner Nyquist reporting on the meeting held on the 22nd:

> "the negotiating committee ... decided that the three faculty members from each institution would be given approximately one month to meet together to resolve the important issues with respect to the merged institution: its educational and enrollment goals; its staff requirements; the location of its programs; and the resources required to finance the educational and general expenditures of the institution. The plan is to cover the years 1973-74, 1974-75, and 1975-76.
>
> "The faculty representatives have agreed to develop their plan by January 2, 1973."

Considering the hopes, fears, and convictions that were about to collide, this time table was wildly optimistic. The faculty teams met for the first time in negotiating session on December 7. In the words of Dr. John R. Haines, Director of the State Education Department's Management Division who attended all the faculty sessions, it was "Pearl Harbor all over again."

The proposed agenda submitted by the PIB group and Dr. Ferri's handwritten notations indicate the underlying difficulties. The nexus of disagreement lay in PIB resolve that Brooklyn be acknowledged the main campus, and that the merged institution continue PIB's practice of offering degrees in the social sciences and humanities as well as in science and engineering.

PIB was willing to offer appropriate programs at satellite campuses. Interpretation of what was appropriate diverged. When NYU administrators suggested that undergraduate programs be offered in Farmingdale, where PIB had long had a graduate center, they found PIB faculty less than enthusiastic. SES people, on the other hand, proposed "establishing the Polytechnic Institute of Brooklyn as an affiliated engineering institution of New York University operating as a primary campus location in Brooklyn, but also offering such programs as may be necessary in Washington Square and other locations ..." They felt PIB in Brooklyn should offer only engineering, and for other courses "should take advantage of strong activities in other fields of knowledge already existing in other schools of the university ..."

SES people spoke in earnest terms about the advantages of the sumptuous new Bobst Library, and the profusion of cultural events the University had. PIB faculty questioned them closely, and decided that few SES respondents took much advantage of these riches.

Only time could remove such an impasse. The faculty groups met throughout the Christmas holidays, often into the small hours. By December 29, 1972 they finally arrived at eight items they could agree upon:

1. The merged successor institution shall have a new administration, a new organizational structure, and a new name which will reflect the fact of merger and the increased scope of the institution's activities.

2. No members of the faculties of either institution, NYU/SES or PIB, shall be terminated as a condition of the merger.

3. No degree programs currently being offered by either institution, NYU/SES or PIB, shall be terminated as a condition of the merger.

4. The new institution shall be affiliated with New York University to provide benefits for faculty and students alike and to increase the range of activities, visibility and research capability of the new institution. Such affiliation may be by contract or other device which assures self-determination and fiscal independence of both institutions.

5. Teaching and research shall take place at such locations outside of the Brooklyn campus as will enhance the over-all educational program and attractiveness of the institution to students and faculty and will increase the ability to attract research. The Farmingdale Campus, Washington Square, the Harlem River Complex, and the Bronx or Westchester shall all be considered on their merits.

6. NYU/SES and PIB will actively and jointly pursue the possibility for the new institution to offer undergraduate programs at Farmingdale and continue graduate programs in the Bronx and Westchester.

7. It is recommended that the faculty, administration and trustees of PIB, and NYU and the new institution, as appropriate, jointly address the problem of assuring that the new institution will be self-supporting by the beginning of the academic year 1975-76 and establish mechanisms for increasing revenue and efficiency and/or providing for an orderly consolidation, if necessary.

8. NYU/SES and PIB will jointly study appropriate mechanisms for fostering joint educational and research projects involving NYU and the merged institution, as well as mechanisms for innovative educational programs and interdisciplinary research. One possible scheme which will be considered is the establishment of a special "institute" jointly sponsored by NYU and the merged institution.

The Joint Institute, mentioned as point 8, was a compromise concept. Projected as an affiliate of the new merged institution and NYU, would be a research operation under the direction of Professor Ferri who held the bulk of SES research monies. Ferri, who directed the Aerospace Research Center of SES on the Harlem River just below the Heights campus, saw the Joint Institute spinning off approximately $150,000 a year to the merged institution as overhead payments. The operation was to have its own Board of Trustees and preserve considerable independence from Brooklyn. It is probable that Ferri saw this as an opportunity to maintain close ties to NYU/Washington Square where he held the Vincent Astor Professorship of Aerospace Research. The status, rights and security of the faculty of the merged institution had to be settled before the financial plan prescribed by law could be drafted. The faculty negotiators turned to these areas and by the first week in January, agreement in principle was reached on the following points:

The SES faculty would have their prior services count toward seniority, sabbatical leaves and retirement as if it had been at PIB;

> All faculty members at PIB and SES who held tenure during the academic year 1972-73 (list of December 1, 1972) shall hold tenure in the new institution. This excepts those faculty members who resign voluntarily or who have already been advised that their service would not be continued through or beyond the academic year 1972-73;

Not all members of the faculty negotiating teams were insistent on the tenure question. One or two, in fact, were opposed, saying that a healthy balance between tenured and untenured faculty would better serve the new institution. The majority favoring tenure on both faculties was so strong that opposition had small chance. Continuing from the agreement in principle:

> An equal number of representatives of both PIB and SES shall constitute a faculty evaluation committee of the new merged institution to consider the continued appointment of non-tenured faculty members, the attainment of tenure, and promotions.

The SES group made further requests that were discussed but not settled at that time -- that all non-tenured SES faculty receive initial appointments of at least two years, with one-third of the group receiving three-year appointments, and that those SES faculty members due to receive tenure by September, 1973 be given tenure at the new institution (2 members). They also asked that non-tenured Research Associate Professors be offered a one-year appointment and preference for regular faculty appointments if such positions were to open up. While the prospective addition of 77 tenured SES faculty members promised a faculty-student ratio of less than 10:1 -- an expensive level for a financially hard-pressed institution -- early calculations assumed that at least 10 of the SES faculty would be fully supported by research grants. Additionally, normal attrition through retirement and resignation was expected to produce a faculty-student ratio of 13.5:1 within four years.

Projections of student enrollment were necessarily vague. PIB hoped that most of the current engineering student body from SES would transfer to Brooklyn; the SES faculty was dubious. It was at least partially in the hope of retaining a larger proportion of their students that inspired the repeated attempts to keep a number of course offerings located at Washington Square. To find new sources of tuition revenue, various additional sites were discussed. The addition of undergraduate programs at PIB's Farmingdale center for graduate studies, an unspecified

location in Westchester, and courses in the Bronx and Manhattan were all proposed. As the final agreement worded it:

> Teaching and research shall take place at such locations outside the primary Brooklyn location that will enhance the over-all educational program and attractiveness of the institution to students and faculty and will increase the ability to perform research. The Farmingdale Campus, Washington Square, the Harlem River Complex and the Bronx or Westchester shall all be considered.
>
> Program locations will be considered on their merit and the final determination will take into account but not be limited to criteria relating to student recruitment and retention, potential growth of program, facilities, availability of faculty and finances.

While this may seem to have been the obvious compromise, the diverse interest of the two faculty groups made it hard to come by. PIB negotiators feared that dispersing courses away from Brooklyn would skim the cream of research and the more glamorous offerings, leaving only the bread-and-butter routine courses in Brooklyn. The SES negotiators, in addition to wanting a close tie to Washington Square, considered the PIB Brooklyn campus to be unattractive, and the Farmingdale campus difficult to reach from their homes in Westchester. Brooklyn seemed a long way off to them and, they believed, to most NYU students.

Salary Equalization

Salary negotiations were complex and troublesome because of the dire financial plight of the two institutions. The PIB faculty had negotiated a salary agreement with their administration before merger talks began. The AAUP unit on campus, after months of effort, had won agreement to an average salary of $16,800 with fringe benefits amounting to 11%. This agreement was to run for a year past the contemplated merger date. The SES faculty had been awarded contracts for an average of $19,500 with fringe benefits amounting to 14%. Because of the financial straits in which the NYU administration had found itself, SES faculty members had not been granted a raise during the previous two years. They were demanding a raise from the new merged institution; the PIB faculty wanted salary equalization with whatever rate the SES group received.

After protracted negotiation, it was shown that the engineering salaries at PIB (omitting the social sciences from the equation) and the

engineering salaries at SES (omitting one or two very highly paid faculty who decided not to join the merged institution) were approximately equal.

In the final merger agreement, specific amounts of salaries are not specified:

> "(g) Faculty Salaries.
>
> (1) the initial salary of a former NYU/SES faculty member at [the merged institution] shall be specified in his letter of appointment. The salaries of PIB faculty members at MI* shall be specified in the letter of agreement between the AAUP and the PIB administration dated August 3, 1972.
>
> (2) On or before February 1, 1974 the PIB administration and the AAUP shall reopen negotiations for an additional economic package and salaries for members of the bargaining unit to be effective retroactively to September 1, 1973."

The provision went on to say that "The distribution of salary monies assigned to the bargaining unit shall be carried out" on a carefully defined three-step basis. This originated in the total ignorance of the eventual financial resources of the new merged institution that was shared by all negotiators. It was felt that if it turned out that money for raises became available, that money (imaginary, but quarreled over if it should eventually exist) should receive the following distribution:

> "(i) Sums allotted to the professional (non-faculty) librarians shall be at the same ratio of the total sum as the ratio of the professional librarian payroll to the total payroll of members of the bargaining unit as of the date of the revised agreement resulting from these negotiations.
>
> (ii) The remaining funds not covered under (i) shall be allocated to the prior PIB and NYU/SES faculty members as of the date of the revised agreement resulting from these negotiations.
>
> (iii) Both the amount of funds and their allocation (within the restrictions set forth above) shall be subject to negotiation. It is intended that at least one-third of the funds so set aside shall be devoted to merit increases and be applied pursuant to procedures to be negotiated between the parties."

Item (ii) was arrived at late one night at a home of one of the negotiators. During much of the negotiating period the sum of money the State would grant to the new institution -- and for how long -- was unspecified.

*MI = Merged Institute

It was not until Drs. Hollander and Haines of the SED received word from the State Budget Director on the amount the State would finally grant that the log-jam was broken.

Former PIB faculty members who had been active in Albany on the Institute's behalf are sure that the supportive attitudes of the Brooklyn legislative delegations were an influence on the State Budget Office. They say they know of no specific representations legislators made to either the Budget Office of the SED as the crux of negotiations neared. They are certain, however, that such friends of PIB as the late Jules Venner, Counsel to Senator Jeremiah B. Bloom, the then Minority Leader Stanley Steingut, and Senator Samuel L. Greenberg would not have willingly been silent had their views been needed for the Executive decision on whether funds should be allocated.

The faculties insisted that, in the unlikely event there were more operating money than was being forecast, the salary scales should reflect a fair share.

Attempts to formulate "a mechanism for severance" got nowhere. Since all parties to the negotiations realized that tenure, as such, was not in question, the discussions focused on ways to keep the number of faculty within the financial limits of the new institution. It quickly became apparent that severance could not be discussed as a matter of principle. There were too many contingencies to cover -- who shall decide and on what grounds and at what point? There was not yet enough mutual trust established for the faculty groups to give this power of decision to any person or group. In the end, it was decided to forego writing any agreement on severance into the final document. Instead the matter would be decided on a case-by-case basis if and when the need arose. Realistically, the numbers of faculty who would be retiring or transferring or not accepting appointment made it a non-question in the final outcome.

One faculty negotiator said that although there are good arguments against tenure, he could not see a new fledgling institution attempting to make national academic history in initiating a break with tenure. Such pioneering, he felt, could only be effectively undertaken by an institution such as Harvard or M. I. T. Where the new merged institution might find it had tenured people unable to do what would be needed, or requiring pay and benefits impossible under the specific circumstances, those instances ought to be handled on a case-by-case basis through an orderly procedure

of due process with protections for the individuals. As for enunciating a new, generally applicable mechanism for severance, he found that he was unwilling to give its decision-making power to any of the persons he knew at either of the merging institutions, himself included.

One rock upon which the whole merger scheme nearly foundered came out of an agreed draft from the subcommittee on Governance. Both faculty groups were aware of what they were sure were weaknesses in the administration of PIB. They wanted the merged institution to have a vigorous and resourceful leadership which could help guarantee a technological institution of the first rank. Their recommendations to achieve this included the following clauses:

> "2(i) The chairman of the Board of PIB will make best efforts to obtain resignations of inactive members of the Board.
>
> (ii) For a period of three years from the date of merger, new members of the Board will be nominated by the Board of Regents in consultation with interested parties."

On February 1, the merger committee as a whole met to discuss the recommendations. A PIB administration representative said that he was going to take the report back to his Board with the recommendation that they reject it. There was to be a PIB Board meeting the following day, and he promised to report back the Board's reaction. It was at this point that frayed nerves snapped, and it appeared that the merger would be canceled. A few days later Dr. Grad resigned the presidency of PIB. Almost at the same time Dr. Ferri resigned from the negotiating committee.

By the 12th of February, things had settled down a bit. A PIB Board member explained that, as a privately chartered institution, PIB could not let a public body select its Board members. He reaffirmed the PIB Board's eagerness to go through with the merger.

In the final merger agreement, Board renewal was the responsibility of the current Board members. They pledged to seek the resignation of inactive members, and to seek recommendations for nominations from all parties to the merger. Further, one or two positions (the exact number in disagreement was left to arbitration by the Commissioner of Education) in each class of Board members (one, two or three year terms) shall be reserved for nominations by the faculty, subject to approval and election by the Board.

Sharing of Powers and Responsibilities

One device suggested by the PIB faculty team to assure the SES group that they would not be swallowed up in the merger was to have committees with equal representation from both units to make decisions and recommendations after merger. These equal committees would deal with such problems as recommendations for tenure as new faculty became eligible, recommendation of department heads, participation in the presidential search committee, and work with the Faculty Senate on planning programs of course work, admissions, educational policies, graduate and undergraduate curriculum and standards, research policies and the library. This suggestion, offered at first to deal with problems of tenure, was used again and again as negotiations proceeded, and worked very well.

The tensions and uncertainties of the negotiations were exacerbated at nearly every point by the reluctance of the State Budget Department to specify the grants it would give the new institution. Most of the planning for merging faculties, involving questions of tenure and severance, and determination of program offerings at specific locations would have been far more easily accomplished within known dollar parameters.

The State, naturally, did not wish to write a blank check, and after the previous failure of negotiations, they were awaiting a positive agreement before committing State funds. However understandable this may have been, it made the whole process a great deal longer and more difficult than might otherwise have been the case. The circularity of the problem -- the impossibility of planning programs without a budget vs. the impossibility of granting a budget without specified programs -- underlay most meetings. A subcommittee charged with projecting the financial planning for the next few years found few hard facts to work with. The multiple unknowns -- of student enrollment, sites (and therefore costs) of operation, expected research grants, specifics of course offerings and budgetary aid -- made the task frustrating in the extreme. As the State-mandated deadline for agreement neared, the budget strategy which was quite deliberately left out of the formal draft agreement, waited on word from the State Budget Office. Planning proposed that, after merger, the SES faculty would receive a minimum 5-1/2% raise, while the PIB faculty, with a lower average wage, would receive a 10% increase.

Because the terms were not specified in the merger agreement draft, considerable pressure was building up within the SES faculty, and the SES negotiators met with growing discontent and resistance. The pledge of an increase was sufficiently convincing to win a majority vote in favor of merger.

The agreement was typed in final form in the Pan Am building offices of Royall, Koegel & Wells, a law firm representing NYU. Dr. Haines took it to Albany, where it was processed at the SED, then to New York where it was finally signed by administrators and faculty representatives of both institutions on April 23.

Following yes votes by both faculties, Commissioner Nyquist pledged to ask the legislature for $3.3 million in aid for the NMI for academic year 1973-74. His support of the aid request made approval by the legislature and the Governor's office likely.

AFTERMATH OF MERGER

I. THE PROBLEMS

The first fall term of the new merged institution opened in circumstances unique in educational history. The new president assumed office on October 15, 1973, succeeding Norman P. Auburn who had been Acting President since the resignation of Arthur Grad several months earlier.

The major problem was to make the merger work. After all the trauma and tensions that preceded the agreement and had left residual feelings of distrust, the Carnegie Corporation's support made possible a chance for perspective that has proved crucial. Analysis of the most urgent tasks showed sixteen major areas that needed immediate action:

1. Weld the two faculties of the PIB and the NYU/SES into a whole, overcoming the exacerbations, rivalries and fears generated by the merger process.

2. Reduce the combined faculties by a number equal to the additions brought by merger -- a requirement set forth by the State Education Department as a condition for making payments in the two years of State subsidy after merger. (See Appendix C.)

3. Initiate a vigorous undergraduate recruitment program to turn around the steady decline in the freshman class which had decreased from 495 in 1970-71 to 275 in September 1973.

4. Open the Farmingdale Graduate Center in Long Island to undergraduate programs -- an action necessary to reduce the operating costs of the Center.

5. Develop, as mandated by the merger agreement, academic operations in Westchester County to fulfill the function that earlier had been provided by the presence in the Bronx of the NYU/SES.

6. Through the combination of the previous three goals, achieve by September 1975 a student to teaching faculty ratio of 15-1, from a pre-merger ratio of 19 to 1.

7. Enhance the research program, so as to increase the total volume of research in spite of contractions in faculty strengths.

8. Activate searches for all academic positions <u>simultaneously</u> (a probably unique task in American higher education, as the orderly process whereby one proceeds from Provost to Dean to Department Head could not be followed). The clause of the merger which mandated the searches created a "lame duck administration" at all levels of Polytechnic and fanned internal factions at the most crucial time, when strong administrative actions were required to reduce the faculty and generally turn around the Institute.

9. Undertake negotiations with the faculty union and the other unions for new labor contracts to be effective at the beginning of the second academic year (1974-75) after a period exacerbated by major lay-offs and by the presence of a large number of faculty members who had been kept in limbo concerning tenure decisions. The situation was made even more difficult by the fact that the NYU faculty had received no pay raises for two years, and that the full professors at Polytechnic -- who constitute the largest rank of the faculty -- receive a salary on the average of $5,000 less than the similar rank at the State University of New York.

10. Establish stricter control on academic quality.

11. Take whatever measures were necessary to revitalize such Departments as Chemistry and Mechanical Engineering, that had suffered in the years prior to the merger.

12. Develop a major development program, to provide Polytechnic with short range support from private sources and to create the basis for a campaign of longer range support.

13. Undertake a vigorous public relations effort to promote a greater consciousness in the community of the presence and strengths of Polytechnic.

14. Develop plans for the future of Polytechnic that would constitute the basis for academic, financial and geographic development of the Institute.

15. Augment the strength of the Board so as to enable the new Polytechnic to respond to its new opportunities and needs.

16. Make measurable progress toward balancing the budget for the first time since 1962.

The two and one half years since merger have seen these challenges met and, in large measure, resolved. Specifically:

1. The two faculties at Polytechnic have been effectively merged into one with a minimum of strife. It is hard today to differentiate between former NYU and former PIB faculty.

2. The process of reducing faculty has been also carried out with a minimal amount of trauma in spite of the fact that the reductions have been higher -- and have occurred at a higher rate -- than those which in previous periods threatened the internal stability of Polytechnic. Since the merger we have reduced faculty strength from 269 to 217, a 20% reduction; further reductions are in process.

3. The freshman recruitment program has been most successful. The declining trend has been sharply reversed so that at the beginning of the 1975-76 academic year the freshman class reached 550 exceeding the 1970 class. This figure represents an increase of 100% in two years, probably one of the largest nationally.

4. Through a sensitive negotiation with Hofstra University, the State University of New York at Stony Brook and the State Education Department, undergraduate programs at Farmingdale in Long Island were opened to four engineering curricula, with a freshman class of 74 in 1974-75 and 189 in 1975-76.

5. A Charter amendment was obtained from the Board of Regents to permit operation in Westchester. Through a cooperative arrangement with Pace University, Polytechnic has started offering a joint program in industrial management as well as several other graduate courses in engineering and applied science.

6. The goal of a student-teacher faculty ratio of 15-1 mandated by the State at the merger has been met and exceeded at the start of the academic year 1975-76, from a ratio of 10-1 immediately prior to the merger. The actual ratio is now closer to 16-1.

7. The expansion of the research program has been pursued aggressively, reaching a research volume of some $4.3 million for the 1975-76 academic year -- an increase of 30% over the 1972-73 volume and of 34% in research productivity per faculty member.

8. Searches for all academic administrative positions -- from Provost to deans to department heads -- were carried out and almost totally completed within the first academic year after the merger. Given the urgency to bring rapidly the academic administration in a position to function, and also given the imperative not to expand the new Institute personnel, in the first year all the academic administrators were appointed from the inside. Some searches were instituted during the second academic year. Three administrators have been recruited from the outside: A new Dean of Arts and Sciences, Dr. Bernard Bulkin, former chairman of the chemistry department at Hunter College; a Director for the new Center for Regional Technology, Mr. Ruben Brown, former Executive Director of the Council for the Environment of New York City; and a Professor of Management and Director of Policy Studies, Dr. Anthony Wiener, Chairman of the Research Management Council of the Hudson Institute since 1964 and co-author with Herman Kahn of "The Year 2000."

9. Labor negotiations were carried out with the three unions at Polytechnic at the peak of the past inflationary wave. The settlements reached gave the Institute two years of internal peace at a decisive time.

10. To enhance the quality of faculty, the granting of tenure and appointments to higher rank have undergone more rigorous scrutiny than in the past.

11. Actions were taken to strengthen the Chemistry Department. To date these have included the recruitment of two members as replacements: Dr. Eli Pearce, who has an industrial research background, and Dr. Lawrence C. DeBolt, a student of Dr. Paul Flory of Stanford. The

new Dean of Arts and Sciences, Dr. Bernard Bulkin, is a dynamic young chemist with impressive academic credentials.

12. A development program was initiated with clearly defined goals. The first step of the program is a campaign for $6 million of which some $4 millions are already on hand in pledges. The most significant element of this campaign to date has been a challenge gift from an alumnus, Dr. Jacobs, for $1 million, to be matched by an equal amount by the Board. Substantial grants have been obtained also from IBM and the Sloan Foundation. The activities for the campaign have included the articulation of a "Case for Polytechnic" through a series of significant documents, a program of contacts with alumni throughout the nation, and a total reorganization of our public relations development and communication staffs.

13. A continuous public relations campaign has been undertaken, which has put Polytechnic's name much more frequently in the news than ever in the past. A particularly vigorous campaign has been carried out in Long Island in support of our developing programs there. The campaign has included the institution of generally well-attended breakfasts for executives from Nassau and Suffolk Counties every Thursday morning at our Long Island Center. These breakfasts have helped cement relations with the business and industrial communities.

14. The $300, 000 grant from the Carnegie Corporation made possible both short and long range plans for Polytechnic. This was perhaps the most essential, even if unspoken, need or Polytechnic -- to give to the new Institute a sense of its role in New York and more broadly in the national and international community, and to challenge the Institute to greatness. A substantial grant received subsequently from the Sloan Foundation enabled the Institute to support the planning for the establishment of a School for the Management of Technology that will consolidate faculty and programs at Polytechnic in this area. The Andrew W. Mellon Foundation has also underwritten efforts whereby Polytechnic is experimenting with programs concerned with the interface between the humanities and technology.

15. The Board has been expanded numerically through a successful petition to the Board of Regents to increase its members from 25 to 33, and has been diversified through the appointment of distinguished new members with backgrounds in areas such as investment banking, civic leadership and architecture. A Long Island Advisory Council has also been established, and a National Advisory Council is in the process of being established.

16. Actions were taken to press steadily for budgetary economies. These ranged from the merger of the Humanities and English departments, to replace the Psychological Testing Service with an outside agency under contract, to the reduction of academic and non-academic personnel. These were effected by a process of consensus attained by an Institute Operations Review Committee chaired by a Trustee. As a result, the goal of a balanced budget will be reached by 1976-77. Inflation both in labor and plant operation costs make this a slow process. We therefore found it

CHART D

POLYTECHNIC INSTITUTE OF NEW YORK

OPERATING DEFICIT — RISE AND FALL

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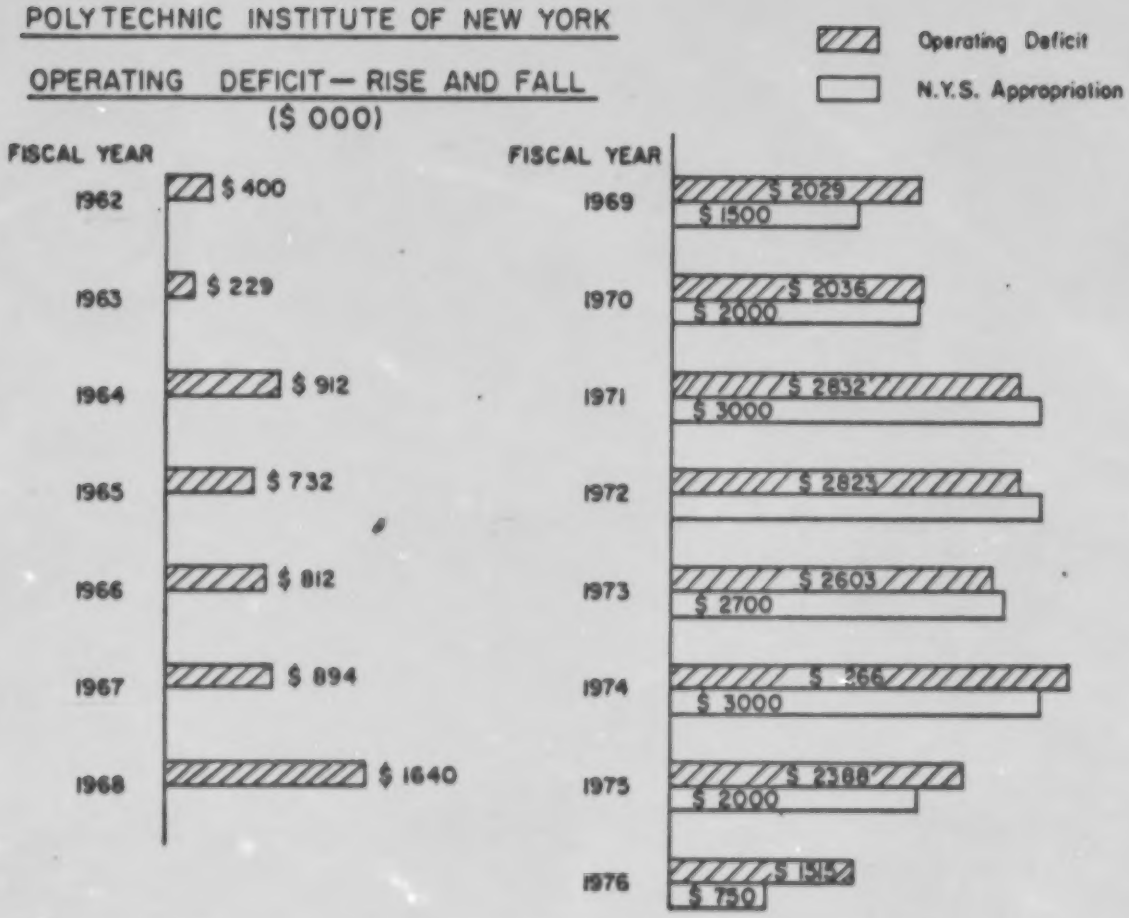


1977 Zero Deficit Projection

necessary to request continued State support and were successful with an outright grant of $750,000.

The State action may have recognized progress toward budgetary goals that had been set during negotiations somewhat wishfully, and that were made even more difficult because of inflationary pressures with skyrocketed fuel prices and other costs.

In suffering comes wisdom, as Aeschylus was perhaps the first to remark. Having suffered through the long and tortuous process of merger, what have we learned about the conditions that determine the outcome?

The primary determinant is the strength of the units involved. In this case, it was not the merger of two sovereign units, able to negotiate freely. Polytechnic, while independent, was in crisis. Its former President and faculty had long been at odds; the President resigned in the midst of the merger negotiations. The Trustees had to become involved by default. Financially, Polytechnic had to continue receiving State money to survive.

SES was being cast off by NYU and was not negotiating for itself. The Administration of NYU was strong, but its goal was not the creation of a viable merged institution; it was rather to come up with an arrangement that would permit sale of the uptown campus. The satisfactory disposition of its engineering school faculty and students was a desired objective, but was not its highest priority.

There were, in reality, five parties to this merger: the Administration of Polytechnic, in flux; the faculty of Polytechnic, deeply concerned over its position in the new institution; the Administration of NYU, with quite different goals; the faculty of SES, insecure about their personal futures; and the State, which had mandated the merger as a means of ending annual subsidies to a private institution.

This diversity of strengths, motivations and goals resulted in an agreement that nearly destroyed the new institution before it could begin.

Of the many factors that threatened the success of the merged institution, financing represented the most serious misjudgment. Polytechnic had been receiving $3 million a year from the State prior to merger. Even with that subsidy the cumulative deficit had been growing. $3 million was the minimum necessary to its continued operation. After the merger, that same sum would, for the first year, also have to be stretched to cover vastly increased liabilities -- the absorption of 64 SES faculty with a

payroll of $1.6 million, but a faculty that brought only 315 full-time equivalent students and between $400,000 to $500,000 in sponsored research. The overoptimistic projections at the merger had been for 550 FTE students and $1.8 million in sponsored research coming to the newly merged institution from NYU-SES.

In the second year of the merger, the subsidy would drop to $2 million and the State required at the end of that period that the new institution have its budget in balance. Totally disregarding the raging inflation at that period, simple arithmetic proved this to be impossible.

Adequate funding required an enlarged student body, a fact that was recognized during the negotiations, but was insufficiently resolved. NYU had long delayed access to PIB to recruit from the SES student body, although it permitted other schools access to its students. Several plans for expanding enrollment had been discussed, including establishment of undergraduate courses at the graduate center in Long Island and the inauguration of classes in Westchester. When the time came to move rapidly for realization of this desired growth, Polytechnic was delayed by the long process of applying for registration of new programs.

In the case of undergraduate programs on Long Island, the process took several months which seriously delayed recruiting. It was two years before limited approval was granted for the Westchester operation. This, in conjunction with the small number of SES students transferring to the new institution, made budget-balancing a sheer impossibility.

A prime factor in the financial stability of any institution is the size of its endowment. One would assume that the merger of two institutions would include the merger of their endowments. Polytechnic had an endowment of some $5 million; SES had no separate endowment, but it certainly should have been entitled to a share of the monies NYU received from sale of the uptown campus after mortgage debts were paid when it migrated to be part of a new merged institution. Equity would have dictated the transfer of some substantial part of the $30 millions thus realized. NYU's dower to its departing daughter was instead only $400,000. As a consequence the endowment per student at the new institution went down, declining from PIB's $2,569 in the fiscal year of merger ending June 30, 1973 to $1,860 per full-time equivalent student at Polytechnic Institute of New York in 1973-74.

A merger should also meld and enhance the fund-raising operation of the two combining institutions. SES, however, had never raised money separately from NYU, and Polytechnic's development program had been minimal and sporadic. For its first hundred years Polytechnic did little or no fund raising. In 1954 a volunteer group of alumni began a small effort, but this was not sufficient to provide a sound financial base for an institution that had developed large graduate enrollments and a major research-oriented program. An effort was launched in the '60's to raise money for an academic building. A substantial sum was raised, but the rapidly developing financial crisis siphoned off gift income into operations.

The need for revamped and strengthened fund raising was recognized, but the building of a strong development effort takes time. Even after the department is established, long months are needed to reach out effectively to the community, to industry, to the alumni. Here, again, the two-year deadline imposed by the State was wildly unrealistic next to the time required to achieve a steady and reliable flow of contributions.

Alumni of "Brooklyn Poly" needed time to adjust to the new Polytechnic Institute of New York. A more serious effect of merger on fund raising was the absence of access to SES graduates. One NYU alumnus sought and was granted an injunction preventing the release of SES alumni lists to the new institution. This cut off a potential 15,000 donors right at the start.

The Polytechnic Board of Trustees, in the past, had not been deeply involved in fund raising. A long-time Board member recalls an earlier Chairman assuring prospective new Trustees that meetings would be infrequent and brief, and that no fund raising would be expected.

With the restructuring of the Board at merger, time was needed to get the members involved in what was essentially a new venture for many of them.

Community perception of an institution, so important to its ability to develop financial support, was in this case either poor or fuzzy. Much of the "news" about both Polytechnic and SES in the years before merger had been about financial crisis rather than about accomplishments in teaching, research and community service. The changed name was an added handicap to recognition. This problem is only now being resolved.

Merger normally brings about economies of consolidation. The savings from elimination of plant maintenance, purchasing, services, and

housing costs all accrued to NYU with the sale of the uptown campus. The new institution, on the contrary, had to increase its expenditures to accommodate the larger faculty, student body, and the expanded sites.

The role of the State in this merger was complex. The "State" in this context was not a single entity but at various stages comprised:

The Board of Regents
The New York State Legislature
The Office of the Governor
The Chancellor of SUNY
Individual SUNY campus Presidents
The State Department of Education
The State Office of the Budget

Each of the major groups involved at any stage of the merger discussions had its own priorities and its own definition of goals. Each had a full list of responsibilities and preoccupations competing for its attention. Among the various roles played by the State were to 1) authorize purchase of the NYU uptown campus; 2) provide subsidy to the Polytechnic of Brooklyn; 3) provide subsidy to the new merged institution; 4) draft legislation mandating the merger; 5) certify courses offered by the expanded institution; 6) mediate at the negotiating sessions; 7) monitor financial reports from the merged institution.

A fundamental problem in the merger was the interface between public and private education in New York. Polytechnic has the largest graduate enrollment in engineering in the United States. It had in 1973-74 the second largest program of engineering research of any academic institution in New York State. Our area will need more, not fewer, well trained engineers if we are to deal effectively with the escalating problems of creating new jobs through new industries, of energy and resource depletion, transportation, pollution, and housing. A major engineering and science facility is vital to New York, not only for the graduates it will produce but also for the research that is carried on within its laboratories -- particularly research of direct interest to the metropolitan region.

A working partnership between regional governments, area industries, and an engineering center can advance the well being and prosperity of all three. If the merger had been thought of by the State in those terms, it would have been seen as the creation of a very significant resource, and the investment of an adequate amount of money and time would have been seen as an opportunity rather than a drain.

The three ingredients necessary to a successful merged operation were:

Financial resources sufficient to carry out decisions essential to move forward;

Information necessary to plan a viable operation, including number of faculty and students, amount of research transfer, location of campuses;

Time enough to develop private support, attract more sponsored research, recruit more students.

All three were lacking to a nearly fatal degree.

AFTERMATH OF MERGER

II. PLANNING, IMPLEMENTATION, AND PROGRESS: THE OPPORTUNITIES

If a new -- or renewed -- institution is to have the academic quality to fulfill its teaching commitments, the creative foresight to take leadership in its fields of competence, the research talent to contribute to society, and the administrative ability to balance progress against stability, it must have reliable means to make its plans, actions, and evaluation operate as a built-in foresight factor.

The November 1973 Carnegie Corporation planning grant was invaluable for the newly merged Polytechnic Institute of New York. It allowed the new institution to plan for a major role as a regional and international center of learning and research and to plan for efforts that can permit it to achieve the financial stability needed for its new mission.

The first requirement of realistic planning is a clear view of present status. Polytechnic used the traditional study approaches: an assortment of respected outside experts, and task forces of in-house faculty. It also used the less traditional but revealing practice of listening to students. An essential goal, as one Trustee put it, was to survive the short term so that Polytechnic can flourish in the long term.

The A. E. D. Evaluation

The merged institution needed a snapshot of its academic quality, department by department. It required authoritative external appraisal rather than reliance on internal self-study.

The Polytechnic Corporation retained, for such an appraisal, the Academy for Educational Development (A. E. D.). The AED selected, from among nominations made by the faculty and by other sources, 34 consultants. They represented 19 disciplines and came from 21 institutions of higher learning and four research laboratories or engineering consulting firms.

These scholars visited Polytechnic from October 11 to November 8, 1973. Their average visit lasted two days. They were asked to evaluate the academic programs; the extent to which the programs were in the forefront of engineering education; the extent to which faculty members supplemented or duplicated each other; the necessity for the program in

a well-rounded educational picture; the quality of the leadership; the modernity of the equipment; the suitability and conditions of the laboratories; the capacity for research; the size of the department in relation to its mission; the suitability of departmental plans, and the need for a given department or segment of a department in a modern school of engineering.

Each visiting authority received advance study materials. These included a current vita for each faculty member, a departmental report when available, and a departmental fact sheet or profile that gave a brief summary. This summary comprised the distribution of faculty by rank, tenure, and age; the number of degrees granted in the previous five years, the number of classes with twelve or fewer students over the same period, and research expenditures during that time.

The overall direction of the study was in the hands of a central panel chaired by AED President Alvin C. Eurich and consisting of the late Detlev Bronk, President Emeritus of Rockefeller University; Keith Glennan, President Emeritus of Case Institute of Technology; Arthur Humphrey, Dean of Engineering at the University of Pennsylvania, and Jerome Wiesner, President of Massachusetts Institute of Technology.

The Study Director was Ruth G. Weintraub, Dean Emeritus of Hunter College. She met with all visitors at least twice; whenever possible, Polytechnic's President also met with them. They talked with all faculty members in groups, and in many instances, individually. Most visitors met both undergraduate and graduate students, visited laboratories and reviewed research. They met, in addition, with at least one senior administrator.

The 19 teams made individual reports that were incisive, candid, and useful. The administration was able to act upon nearly all problem areas the evaluators pointed out, and continues to work on remaining curricular segments that can be strengthened within limits of the Institute's resources.

To a new President, the AED study report findings were encouraging in the literal sense of having his courage strengthened. The AED report summarized the outside objective view of the Polytechnic's programs this way:

> "In general the reports were most heartening but they recognized problem areas and made suggestions for their remedy. ... the Department of Electrical Engineering and Electrophysics and the Department of Aerospace Engineering and Applied Mechanics were listed as being in the top 10% [in the country]."

The comments from the 19 visiting teams -- whose members pointed out weaknesses that were clear to them as well as strengths -- were useful in comprising a syllabus of work ahead to make the new Polytechnic stronger. For instance, as stated in the AED common report, those who examined the Department of Aerospace and Applied Mechanics said:

> "It is our view that the Department of Aerospace Engineering and Applied Mechanics serves an enormously important function for the citizens of the New York area. The department is one of the top schools of aeronautical engineering in this country. It offers the only course of instruction in aeronautical engineering in the area of New York City. For this reason we feel strongly that every effort must be made by the administrations of PINY and the State of New York to see that this facility remains at least as strong as it is today and this strength is made known throughout the high schools in the New York area...."

The visitors to Chemical Engineering reported:

> "... Fortunately, the merger produced little, if any, overlap in areas of expertise... the department has excellent strength in heterogeneous catalysis usually lacking in most departments and transport phenomena upon which to build excellent research programs."

Three distinguished writers for Electrical Engineering and Electrophysics -- the field in which PIB had ranked eighth nationally in "Cartter" rating assayed by the American Council on Education -- stated:

> "Of the 51 faculty whose biographies were given us, 25 are in the broad field of electrophysics. These 25 are a strong group and they include a number of internationally famous people. They represent an important national resource for advanced R&D..."

Evaluation of the Operations Research and Systems Analysis Department fount its PIB component relatively strong in its links to the more technical fields of engineering (especially control system engineering) while the NYU-SES strengths were in the fields of statistics and operational research methods.

The picture that emerged from these and other evaluations in the AED study -- evaluations which often contained frank and specific advice -- gave Polytechnic a first and immensely important view of how it looked to the outside, immediately after the merger, and of some of the actions it should take and directions it should pursue. The next element of the planning for the merged institution was the work of four large faculty task forces.

The Four Task Forces

Earlier reports to the Carnegie Corporation have reported what four Task Forces recommended and what implementation had taken place up to the reports' dates. Here we summarize the key points, tell about further actions as well as about steps that will need to be taken, and how this process of self-examination is important to the new Polytechnic.

We can now generalize two years after the Task Forces made their reports. Their charges were distinct but necessarily intersected. Task Force #1 dealt with faculty-student relations, needs for staff to fill program deficiencies, and facilities. Task Force #2 examined the curriculum. Task Forces #3A forecast social factors that will affect the Institute's future while #3B studied what its administrative structure should be. Task Force #4 examined income, expense, and the relation of productivity to financial resources.

Although their findings had different emphases, the recommendations tended to reinforce one another while also modulating their implementation. It was often necessary to change the particular measure being proposed, in the interest of meeting considerations raised by another study group, as will be seen below. The several spectra helped inform, guide, and lend urgency to actions the new Polytechnic administration took.

Student-Orientation

Task Force 1 looked toward a far more student-oriented Institute. It was vital, because it afforded students opportunities by canvass and dialogue to make clear to administrators, faculty, and Trustees their pent-up inventory of shortcomings that required correction.

Leading the recommendations was the request that a Dean of Freshman assert his ombudsman function, improve student retention, and promote student interest in extra-curricular activities during and prior to

the freshman year. To help accomplish these objectives a full-time Director of Financial Aid was appointed. His work freed the Assistant Dean of Students to allocate a lot more time to advising freshmen.

One serious need the Institute has not yet been able to meet because of financial reasons, is a full-time Foreign Student Adviser. One out of five Polytechnic students received his preparatory schooling in a foreign country. One out of seven plans to return to his or her home nation. The need remains pressing.

There has been steady improvement in advising, although this service is still far from optimum. Two departments have come to assign one faculty adviser who will continue to be a particular student's mentor all though his undergraduate years. A third department has begun such assignments for summer students. The practice has not yet become the rule throughout Polytechnic. There are persistent efforts to have more departments regularize their advising practices.

Task Force #1 found that about 25% of students in 1974 felt they were in need of tutorial help, and almost half the students felt qualified to give such help. Nonetheless, lack of tutors in many subjects was found to be a common complaint:

> "Some departments have informal tutorial set-ups. So too has the Black Student Union. Tutorial programs must be set up throughout the Institute with a formal structure to be successful. One could set apart certain rooms,..where tutors and their students can gather. Scheduled hours must be set aside for this activity. The tutors should be students perhaps primarily who are the recipients of Polytechnic scholarships. Tutoring will benefit both student and tutor since an excellent way to learn a subject thoroughly is to teach it."

The tutorial help in freshman Physics and Chemistry begun in Fall 1974 has continued, and is effective. Graduate and senior honors students do most of the tutoring, facilitated by a small fund, under faculty supervision. Funds from an HEW grant expanded the library's stock of remedial texts, references and study materials so that the faculty had access to up-to-date material on reading, grammar, languages, mathematics and English for foreign students. These steps have helped palpably to reduce attrition.

The 1972-73 PIB student retention rate was 66%. The merger target was to raise this to 75 percent. For 1974-75 it reached 82 percent.

This was done by providing more counseling, "one-on-one" tutoring in physics, help with problem-solving in chemistry, an early warning system from freshmen grades, special funds to prevent drop-outs for financial reasons, and more help in English for foreign students. Budget cuts have regrettably discontinued special summer preparatory courses in physics and mathematics and a reading improvement program that were two effective tools for enabling some students with good latent ability to remain at the Institute.

The Task Force made several suggestions for applying instructional technology to advance more self-directed study. Videotapes of the entire freshman Physics course, recording all lectures and demonstrations of laboratory techniques, are in heavy use -- the Polytechnic Library's most frequently borrowed non-print attraction. A video math course is in work, with feedback from students and faculty now guiding revisions.

One major acquisition, the new IBM 360/65 computer, in July 1975, greatly served management, research, and student projects. Providing 20% faster service than a system that had been shared with SUNY Stony Brook, it more than answered the widespread student complaint that it had been difficult to obtain sufficient access to a computer at the times this resource was most wanted.

Polytechnic's computer had a previous owner, but it was new at the Institute, much speedier than the SUNY-Stony Brook shared machine, and cost less net expense per year because some of its substantially greater capacity was soon sold to other users.

Relatively small changes -- such as having specific bulletin boards and the student-operated radio station WINO make "selling" announcements of activities and events conducted by extra-curricular organizations, and making use of Bell Telephone and IBM services to show busy departmental staffs how to be more responsive to student requests -- have fostered improved communications.

The establishment in 1975-76 of the Student-Faculty-Administration Committee (SFAC), to which any member of the Polytechnic community may bring any problem and that makes recommendations to the President, is a stride toward being a more open and accountable institution.

Curriculum Developed

Task Force #2 was requested to recommend areas of curriculum development that "will enable Polytechnic to offer programs which will adequately prepare its graduates to fill leadership roles in the year 2000." Lest this appear to have called for gazing into the distant future, most freshmen who enter this coming Fall will be in their early forties at the start of the next century. Even men and women who earn their doctorates in the next few years will, in most instances, be in their forties in the year 2000.

This group first aimed high:

> "The danger exists that in our efforts to find immediate solutions to problems which relate to our survival we lose sight not only of our present strengths but also of our obligation to maintain and achieve broader excellence. Polytechnic must therefore seek to attract highly motivated, scholarly students and potential leaders who desire exposure to many areas of knowledge.
>
> "These students will seek in-depth technical education and education in the functioning of societal institutions so that they can direct technology to genuinely improve the quality of human life. In addition to the best technical education they should receive sufficient exposure to the contributions of diverse cultures, past and present, to enable them to establish an intelligent viewpoint from which to determine what constitutes improved quality of human life.
>
> "In recognition of the fact that the formal training we provide students now and in the near future cannot adequately anticipate their needs thirty years hence, it is necessary to encourage a style characterized by a desire to continue learning beyond formal education, i.e., we must teach our students to teach themselves. This will require greater departure from the concept of compartmentalized education often characteristic of the textbook-lecture delivery technique. In addition, it will require a conscientious teaching effort to relate the educational process to the world beyond the classroom, i.e., the interaction between current practice and learning."

The Task Force divided into sub-committees concerned with (A) the improving of the Institute's base programs, characterized by long term continuity of knowledge, materials, and approaches, such as Chemistry and Civil Engineering; (B) new and developing programs, and (C) the educating process that should be sought.

A spate of recommencations resulted for base programs. There was concern about a "glaring deficiency in many of our students in written and oral communications skills." This required a concerted effort in English, Humanities, and Social Science offerings, and in engineering and science courses demanding written and oral reports, to overcome this deficiency. Because graduates should be adaptable, with capacity to change with circumstances, students ought to have practice in intellectual and personal skills outside their immediate fields of specialization in both engineering and non-engineering disciplines. To avoid early obsolescence in their professional careers they must also "be educated to recognize the need for, and trained to seek out, information in unfamilar territories."

To acquire judgmental and critical skills it was felt necessary to eliminate "the notion that all possible interesting knowledge and information has already been distilled into textbooks and professional lectures." Students need exposure to the concept that analysis is only a tool, albeit an important one, in the creative process of design or synthesis.

Mechanisms for these goals are increased provision for outside major department electives, directed studies, upper division projects, and internships.

Three basic program voids to be filled were (A) an enlarged and strengthened Management Program, (B) expansion and greater depth in the biological sciences, and (C) an undesignated Bachelor of Engineering degree that can lead to management, the law, medicine, sales and technical writing.

A pervasive base program need, according to the curricular task force, is increased exposure for students to professional practice. Special industry professorships through appointments for periods as brief as two intense weeks to two terms, and internships to enccurage interplay between theory and practice, were recommended. One example given was industry being many years ahead of most universities in interactive computer aided design. Visiting industry professors could offer courses and be nuclei to involve faculty.

Just as Task Force #1 had stressed need for more and better advising, this group called for a vastly improved system to increase flexibility, judgmental training, design exposure, and emphasis on social awareness.

"Advising will become a role as important as classroom teaching," it stated, "and should be recognized and regarded accordingly."

Task Force #2 examined four kinds of possible new programs. Of these, two now show good short-term prospects of becoming distinctive graduate degree programs. These are the Management and Control of Resources and Manpower, as part of the new School of Technology Management and Policy Studies we describe later, and Biomedical Engineering.

The other two programs are less likely to be brought to reality in the ways the Task Force conceived them, but hold promise of longer-term development. These are Robot Engineering -- a field that will be increasingly needed for safety and improved precision in such hazardous work spheres as fire and police protection; exploration into extreme ocean depths and arctic wastes, and hot laboratories -- and Biogenetic Engineering.

The subcommittee dealing with new educational processes looked into seven programs that appeared to have promise for the new Polytechnic. Only one of these has had substantial use, the Advanced Placement procedure, and that largely for credit in the Calculus. In 1975-76 there were 128 freshmen who had passed high school courses and took the College Entrance Board test. Two-thirds passed. Both the number of applicants and those who succeeded are estimated to be 25% more than in 1974-75. Polytechnic also approves advanced placement in Physics, Chemistry, English, and History.

Early Admissions has been less than substantial to date. Some students who were promised high school diplomas by high school guidance counselors or assistant principals after the end of their college freshman years have instead received the inferior General Education certificate. This is unimportant to those who get college degrees, but causes them to feel they are victims of an unjust system.

The Task Force's search into new teaching modes looked at programmed texts, the Keller Method, and the Teaching Information Program Systems (TIPS) developed with Exxon support, and liked what it saw. Financial stringency and the familiar lack of faculty eagerness to consider change are barriers that, once overcome, should open the way to marked progress, particularly because some of the new Polytechnic's

faculty have gained widening renown for their part in production and evaluation of instructional materials making innovative uses of modern technology. The situation resembles that of the mythic shoemaker's children with bare feet.

The use of projects had already for some years been a bright part of PIB learning, and continues. The microwave television link between the Brooklyn, Farmingdale and Westchester centers, now being planned, had its start in an undergraduate student project.

Early diagnosis of student difficulties and follow-up measures were recommended and has been systematically implemented by the Dean of Students. This works. It has signally contributed to reduced attrition.

Task Force #3A was asked "to study the course of society and technology and...[to] present a long-range assessment of where our future technological opportunities will lie."

It listed first in consideration of the job market in engineering the new field of Operational Data Analysis, a branch of mathematics employing statistics, combinatorial analysis, graph theory, and other subdisciplines sharing many areas with computer science. The expansion of Operations Research was regarded as having stopped at a recent plateau. Science and Technical Reporting was expected to soon take the form of an established career requiring a special education particularly suited to a technological university. A similar education would be needed for Science and Technology Advisers to decision-makers in the public sector who had not found consultant advice from professional scientists and engineers useful.

The report anticipated rising need for technology-based generalists able to tap reservoirs broader than engineering, mathematics, and such "hard" sciences as physics and chemistry. Modern systems design, analysis, and evaluation draw from knowledge of economics, the law, psychology, and the fine arts. While one's primary training and experience will be in a single realm of competence, his viewpoint in the future must necessarily be broad.

Professional communication specialists are needed more than in the past, because of the gulf between experts and society. Politics must be informed or become counter-productive. Consumers need to know more before they buy and to maintain the devices they use. And technical

people working together need to be mutually intelligible if joint efforts are to gain results. The technological professionals will increasingly be expected to convey what they know to those who lack their special languages.

As engineers involve themselves in environmental problems they need command of social science skills -- along with knowledge of sociology, anthropology, and history -- to prepare convincing written and oral arguments to politicians and the public. Engineers need training in principles of management and learning techniques that make use of computers and electronic libraries supplying information too profuse for storage by rote.

With technological change continuing to alter the distribution of industries, changes in employment will make professionals think in terms of two or more careers. Educational institutions' role in providing retraining can be significant. The rise in salaries and fringe benefits was forecast as relatively steady; in such a job market the technical professional's measurement of success could be in non-monetary terms, giving greater emphasis to work satisfaction and through work furthering certain social goals. At times of job insecurity, traditional yardsticks are again main factors.

The outlook for institutions is toward highly specialized courses in more subjects while the numbers of students requiring them remains limited. Interuniversity cooperative agreement to provide the offerings economically, and perhaps to provide them at all, should involve shared responsibility and transfer of credits no matter where the courses are taken.

One new function for universities, it was guessed, can be as "think tanks" addressing problems too research-oriented for industry and too application-oriented for traditional academia. Because the pace of technological change presents many industries with difficulty in their research and development capability, small firms could benefit greatly from association with a technological university. Industrial knowledge of management operations could make such relationships mutually advantageous. The most challenging and potentially useful sort of association would provide for shared risks and profits within necessary legal constraints.

Cooperative arrangements with Hofstra University now provide undergraduate engineering on Long Island by the Polytechnic faculty

while most humanities courses are taught by Hofstra personnel. This has since grown apace, and will in time demand expansion from the four fields of engineering concentration at the Farmingdale campus to a closer approximation to the 25 fields available in Brooklyn. Similarly the joint M.S. degree program in conjunction with Pace University at its Pleasantville campus in Westchester and the Polytechnic M.S. programs in Operations Research & Systems Analysis, Electrical Engineering, and Mathematics currently offered at the same site will require capital and logistics planning to meet anticipated needs in Westchester, Rockland and Fairfield counties.

Administrative Structure

Task Force #3B dealt with the Institute's administrative structure. It began with cathartic force, castigating the situation before the merger agreement when all decisions had to be made by the PIB President:

> "...subordinate administrators merely passed requests for decisions to their superiors. Each administrator in the chain could say 'no' regarding decisions, but he could not say 'yes.' Decisions took months to obtain as papers and memoranda passed slowly up the administration to the President, the final bottleneck, inundated as he was with petty problems and paperwork -- and this at a time when the institution was in a state of accelerating deterioration, when rapid decisions were required at all levels -- when the central issue in the mind of the President should have been his fund raising program."

This group thereupon drafted the plan for an administration with clearly divided responsibilities and lines of authority. It proposed decentralized decision-making. We have since put decisions in the hands of the Provost, Deans, and Department Heads. This is now firm Institute policy.

To provide needed management manpower three key administrative posts were established. An Associate Provost for Research stimulates and coordinates research, negotiating contracts without the advantage of seed money to nurture promising new ideas. The Dean of Engineering has been given an Associate whose task is to facilitate collaboration between and among departments. The President's Office has an Exective Assistant whose several duties include staff support of activities of the expanded Board and Advisory committees in Long Island and Westchester.

Because of the plurality of new programs, and the chronic need for quality control over long established activities that cannot be permitted to become pedestrian and perfunctory, there is need for seed money to assure qualified and energetic direction. But that comes within the purview of the task force concerned with resources.

Finances

Task Force #4 studied Institute productivity, budget formulation, and income sources. There has been definite progress in strengthened Trustee leadership, fund raising, recruitment and retention of good students, making the Brooklyn campus a brighter appearing place, integration of the merged faculties, and increase in funded research. Withal, efficiency measures must not become so short-sighted that there is insufficiently fruitful interchange between engineering and the sciences and that teaching effectiveness is taken for granted.

Governance had been a core item in the merger agreement. The new Polytechnic obtained permission to enlarge the Corporation Board of Trustees from 26 to 33 members. Up through the March 25, 1976 Board meeting the following ten persons have been elected Trustees:

Lewis M. Branscomb, Vice President and Chief Scientist, IBM Corporation

Robert P. Brown, retired Chairman, Poloron Products, Inc.

Salvatore A. Conigliaro, President, Sperry Division, Sperry Rand

Joseph Gavin, Jr., President, Grumman Corporation

Paul Hallingby, Jr., Chairman, White Weld & Company, Investment Bankers

Marian S. Heiskell, Director of Special Activities, The New York Times

Joseph J. Jacobs, Chairman, the Jacobs Engineering Corp.

David L. Mitchell, Senior Vice President, First Boston Corporation

Leonard F. C. Reichle, Vice President & Director, Ebasco Services, Inc.

Henry Root Stern, Jr., Esq., Mudge Rose Guthrie and Alexander.

Neither PIB nor NYU-SES had systematic fund raising in the private sector. A committee of the new Polytechnic Board interviewed both the chief executive officers of several professional development consulting firms and the account executives they offered to assign to the Institute's work. Brakeley, John Price Jones, Inc. was retained to make an intensive ten weeks study of problems and potentials concurrently with the planning activities made possible under the Carnegie Corporation grant. The Brakeley Company put to work a team of six, headed by a study director.

After reviewing more than a dozen positive elements and five serious problems, the report of this study recommended a Program for Change seeking $6 million by the end of 1976, while building strength in the Corporation, other volunteer groups and staff for a more ambitious Phase II with an estimated goal of $17 million by the end of 1979.

To date, April 15, 1976, over $4 million in cash and pledges has been raised. This is over two-thirds of the $6 million Phase I objective.

Enrollment and Retention

The entire future of the newly merged Polytechnic required a substantially enlarged number of qualified students, and seeing to it that without relaxation of rigorous standards there would be measurably reduced attrition. At the same time it was necessary to meet the goal set in the merger agreement of increasing the ratio of students to faculty despite the greatly enlarged faculty resulting from merger. All these objectives were met.

PIB's enrollment of entering freshmen had contracted from 495 in 1970-71 to 272, reflecting the national decline in engineering applicants. In December 1973 the Board of Regents permitted Polytechnic and Hofstra University to coordinate their undergraduate engineering programs on Long Island, authorizing undergraduate courses at the Polytechnic campus at Farmingdale as well as at Hofstra's Hempstead campus. In September, 1975, the Board of Regents' authorization made it possible for Polytechnic to offer graduate engineering courses for the first time in Westchester by joining forces with Pace University to offer the M.S. degree in Management Science.

Attracting qualified new students was a necessity. Professors Ernest N. Levine and Richard I. Harrison, former SES faculty members, joined their experience in student recruitment with that of PIB Admissions Director Albert D. Capuro. Even though SED permission to offer undergraduate education in Long Island came too late to reach high school students until the second half of 1973-74, the results of their efforts in the increase of new students at the Brooklyn and Farmingdale campuses of the new Polytechnic were soon evident:

	Fall 1973	Fall 1974		Fall 1975		Projected 1976	
	Brooklyn	Brooklyn	Farmingdale	Brooklyn	Farmingdale	Brooklyn	Farmingdale
Freshmen	262	374	74	375	189	400	200
Transfers	11	105		70	10	75	50
Totals	273	553		645		725	

Concomitant with these increases in numbers has been the increase in quality of the students, as measured by their class ranking in high school.

The problem in increasing enrollment of highly qualified students was to reach high school seniors who demonstrated their ability in science and mathematics, and to let them know what the new Polytechnic offers. There are over 800 high schools in the greater New York metropolitan region alone. A staff of three could scarcely hope to accomplish much when busy high school counselors could usually only make available between half an hour and one hour for their meetings with college-bound seniors.

There was a series of Open House weekends for students and counselors. The new Polytechnic Catalog proved to be a strong asset. It describes areas of study succinctly, with short overviews of each academic field. It has been hailed as a guidance resource on engineering for secondary school counselors.

In addition to computer print-out rosters from the College Entrance Board listing those students who had signified interest in Polytechnic and whose scores in Chemistry, Physics, and Mathematics are high, the Admissions staff has also followed up on a steady flow of referrals from Polytechnic students. The faculty has also signified which instructors were ready to address high school assemblies, and PIB alumni have become involved in the recruitment process.

Rather than merely address high school assemblies, Polytechnic faculty members' new practice of giving technical talks to high school

science classes and clubs impressed Middle States Association of Colleges* and Secondary Schools on recent visits. Robert Rioja, a graduate student, has also assembled a traveling science show for high schools that demonstrates laser beam action, holography, and zero gravity.

The overall enrollment picture at Polytechnic shows an up trend:

	Years ended June 30		
	1973	1974	1975
Undergraduate	1650	1875	1910
Graduate	1690	2441	2440
Total # of Students	3340	4316	4350
Full Time Equivalents:			
Undergraduate	1416	1581	1573
Graduate	741	1095	1107
Total Full-Time Equivalents	2157	2676	2680

The new Polytechnic has set out to do all it can with present resources for increasing the supply of well educated women engineers. The number of entering women freshmen has grown steadily since 1969 and promises to increase further in 1976:

Fall 1969 - 8 1970 - 19 1971 - 22 1972 - 32	PIB	Fall 1973 - 36 1974 - 36 1975 - 39	Polytechnic Institute of New York

In 1974-75 there were 106 full-time and ten part-time women students. Comparable data for 1975-76 are 113 and 19 respectively.

Toward this end the Institute issued in late 1975 a publication titled "A Woman's World" citing Society of Women Engineers data and College Placement Council findings on job market and pay and citing notable women faculty. Its recently published annual report gives high visibility to women students and teachers without singling them out for explicit emphasis. Senior faculty members say that they believe an enduring rise in women in engineering is at hand as women graduate students who derive enormous satisfaction from their studies function as virtual missionaries among young women they know.

On the staff of "Polytechnic ENGINEER," the technical magazine published by students, five out of twelve staff members are women. Among them is the Editor-in-Chief. The 1975-76 winter issue of the ENGINEER was indeed totally authored by women students.

Plant

Prior to merger the Brooklyn campus building had deteriorated. Spartan renovations have contrived some more social space. Other improvements have largely been cosmetic, yet make a real difference. Paint and elbow grease have begun to dispel the aura of gloom exuded by "institutional green" and "institutional brown" hues that had coated interior walls of Polytechnic.

Merging faculties

Given the antecedent conflicts and distrusts described in previous chapters, it is remarkable that the two faculties have become one with a minimum of strife. They all went to work on the task of making the new Polytechnic thrive. Several SES personnel attained positions of leadership. Richard S. Thorsen is Head of the merged Department of Mechanical Engineering. Fred Landis, who had been Head of this Department at SES became Polytechnic Dean of Intercampus Programs before being called to be Dean of Engineering for the University of Wisconsin at Milwaukee. Sidney Shamis is Associate Dean of Engineering for Planning and Operations. By the second academic year of the merged institution the united teaching staff elected Professor John Lamarsh, the former chairman of the SES ad hoc faculty committee that had fought merger and who heads the Department of Nuclear Engineering at the new Polytechnic, as President of the Faculty Senate. Indeed, it is hard today to differentiate between former NYU and former PIB faculty.

Their productivity

The projected cross-over of NYU-SES funded research by the merger negotiators was that $1.8 million in contracts would be transferred to the new Polytechnic. The actual amount turned out to be less than $500,000. Pre-merger PIB research grant contracts were $3.1 million. The current Polytechnic level has reached $4.2 million.

The integrating process occurred when the faculty had to be reduced in size at the same time that its work load rose. Since merger, faculty strength was cut from 269 to 217 full-time equivalent members, a 20% reduction. The merger goal had been to lift the student-to-faculty ratio from 10-1 to 15-1 by Fall 1975. It reached 15.5-1 by start of that term. Because of faculty time allotted to research and the increasing student body, Polytechnic now operates closer to 16-1. It expects to be at 16-1 by Fall 1976.

Under the pressure of tight budgets, some faculty members feel that the merged institution should concentrate on engineering, without diverting limited resources to excellence in the sciences. So long as the Institute is committed to education rather than mere training, however, it must provide solid grounding in science. Engineering needs science, even though a growing body of informed opinion holds that engineering is autonomous rather than derivative. If science teaching is obtained from departments elsewhere, instructional costs are higher and communication among the several branches of engineering and science is difficult. Future engineering advances will depend even more heavily on science than at present. To shape students' philosophy coherently, they should be continuously exposed to the interaction between engineering and the full range of physics, chemistry, and mathematics from regular faculty.

There will always be need to improve teaching effectiveness. The new Polytechnic encourages student participation in the evaluation of instruction. The faculty has organized voluntary programs of lectures and workshops for study and practice of effective teaching methods to orient young instructors, and to focus research into methods for improvement of teaching. There are also attempts to recognize uncommonly able teaching through awards and through merit raises allocated by departmental peer review.

New Programs and Services

The Task Forces funded by the Carnegie Corporation grant defined specific challenges. The new Polytechnic administration had to plan and put into action what they had recommended. A start has been made toward establishing a School of Technology Management and Policy Studies, a Center for Regional Technology, and a Brooklyn Educational and Cultural

Alliance in conjunction with several other Brooklyn educational institutions. This section reviews what their potentials now appear to be, some further planning progress, and tells of efforts to provide regional services through attempting to attract to the New York area the federal Solar Energy Research Institute, and through Polytechnic serving as a subcontracting resource during design and construction of the new nuclear fusion reactor at Princeton.

School of Technology Management and Policy Studies

This new school resulted from recommendations made by Task Forces #2 and #3 concerned with curricula and with the structure of the newly merged Institute, and from discussions with industrial leaders and government officials. Both industry and governmental spokesmen feel there is need for some alternative to current Master of Business Administration and Master of Public Administration programs. Most MBA preparation has little or no reference to technical issues. Industry and government say they want managers with strong technical competence, because many decisions require technological knowledge.

The interface between public and private sectors is also now often critical. Increasingly, persons who have earned respect for their work in one sector move to responsibility in the other. But the two sectors rarely, and then in general only at the federal level, come together. State and municipal governments seldom know how to make use of talent and experience in private corporations, and the latter do not know how to reach out so that their organizations can supply skills for mutual advantage.

Since the Alfred P. Sloan Foundation granted $350,000 for two years support starting in November, 1975, the Director and Associate Director of the School have been developing a curriculum that draws on and augments existing Institute courses and programs in management, operations research and systems analysis, economics, political science, history of science, transportation engineering, civil engineering, energy systems engineering, environmental engineering, and public policy studies.

Starting in September 1976 there will be M.S. programs in technology management and public policy studies. Almost completed are arrangements for approval of M.S. programs in Transportation Engineering and

Policy. Among other School of Technology Management preparations under way are graduate offerings in technology management in cooperation with the Institute's Department of Operations Research and Systems Analysis. The new School's plans build on an established Management Department that has 300 graduate students, seven full-time and ten part-time faculty.

Center for Regional Technology

As reported earlier, this still experimental Center consists of research and selected technical programs of the Council on the Environment of New York City. It has carried forward a year-long dialogue with several agencies of the State of New York. These discussions grew out of Governor Hugh Carey's belief that Polytechnic has research capabilities that can help the State solve or mitigate pressing questions.

The Center has defined priority areas of its concern. These include regional economics and financing, environmental management, energy issues, human resources, and communications. It has set forth an inventory of public policy questions in each sphere. On regional energy issues, for example, the questions are in four groups:

1. Do we get what we think we are going to get in metropolitan regions? -- starting with adequate supplies of clean, safe, and economical energy?

2. As social objectives change, what can be done with old systems? -- such as how do we re-evaluate emissions standards, and how can we put idle or delayed plants to work if they are safe and non-polluting?

3. How do we pay for continued, modified, or discontinued operations? -- as in having improved efficiencies of conversion and transmission processes reflected in price structure.

4. What management capabilities are needed for retrenching energy systems in metropolitan regions? -- with strengthened monitoring of regulatory operations.

With the Council on the Environment of New York City, the Center has contracted with the White House Council on Environmental Quality to analyze the cost-effectiveness of environmental protective measures employed by accident prevention programs and other activities of the Federal Environmental Protection Administration.

Brooklyn Educational and Cultural Alliance (BECA)

Since the incorporation of BECA in June 1975 there have gone forward the renovation of the Granada Hotel to serve as a joint housing and hotel complex, the establishment of jointly sponsored Royal Shakespeare Company performances, initiating the operation of an interinstitutional bus system, and preparations for completion of the Roebling Memorial.

There are good reasons to believe that the revitalization of the Brooklyn Civic Center area can owe much to vigorous development of BECA as an asset to the entire city. The sharing of athletic facilities (St. Francis' pool, the Pratt field house, and the Long Island University gymnasium) has been beneficial to an increasing share of 45,000 students attending public and private higher educational institutions in downtown Brooklyn.

Pending before the National Endowment for the Humanities is a request for a planning grant for the first of three phases of a Brooklyn: Rediscovery project. Its purpose is to popularize, communicate, and involve a wide audience in discovery of their Brooklyn heritage through a series of highly visible activities. Their intent will be to help combat persistent distortions in local, national, and international perceptions of Brooklyn by emphasizing the rich traditions and impressive present resources that make it one of the world's most promising urban places in which to work, study, and live.

Solar Energy Research Institute (SERI)

For over a year the new Polytechnic has sparked the competitive presentation for decision by the federal Energy Research and Development Administration to locate its primary solar energy research center on Long Island. Polytechnic organized a consortium of seven educational institutions, Nassau and Suffolk county governments, five corporations and the Long Island Association of Commerce & Industry, four architectural and engineering firms, the Long Island section of the American Institute of Architects, and the public interest Environmental Technology Seminar.

Supporting the case for the Long Island site, offered for this use by Brookhaven National Laboratories, is documentation showing how hours of sunlight throughout the year closely approximate the average exposure

to the sun throughout the continental U. S. ; what resources exist in scientific manpower, facilities, libraries, and manpower, transportation, communications, and ready access to primary centers of science and engineering, and prospects for interesting the public in long-term investigations intended to benefit households, manufacturing, commerce, and the quality of life in communities.

The two pages of tables indicate support of SERI in the form of endorsements, financing, contributed personnel, services, material, consultation and public information. Many parts of the nation avidly vie to have ERDA place the solar research center in their locales. The campaign for Long Island, led by Polytechnic, marshalls support from numerous interests first introduced to the Institute through its once-weekly bi-county executive breakfasts for industry and government people held since merger.

The outcome of this effort, of course, if very chancy, depending, as it does, on the willingness of the State of New York to see this as an important enterprise, and on a Federal selection in competition with scores of other proposals. Regardless of the outcome, however, the real value of this effort is that for the first time there has been a Long Island-wide effort to think in terms of the well-being of the entire region as a whole, with concerted sharing of work and resources for a common goal.

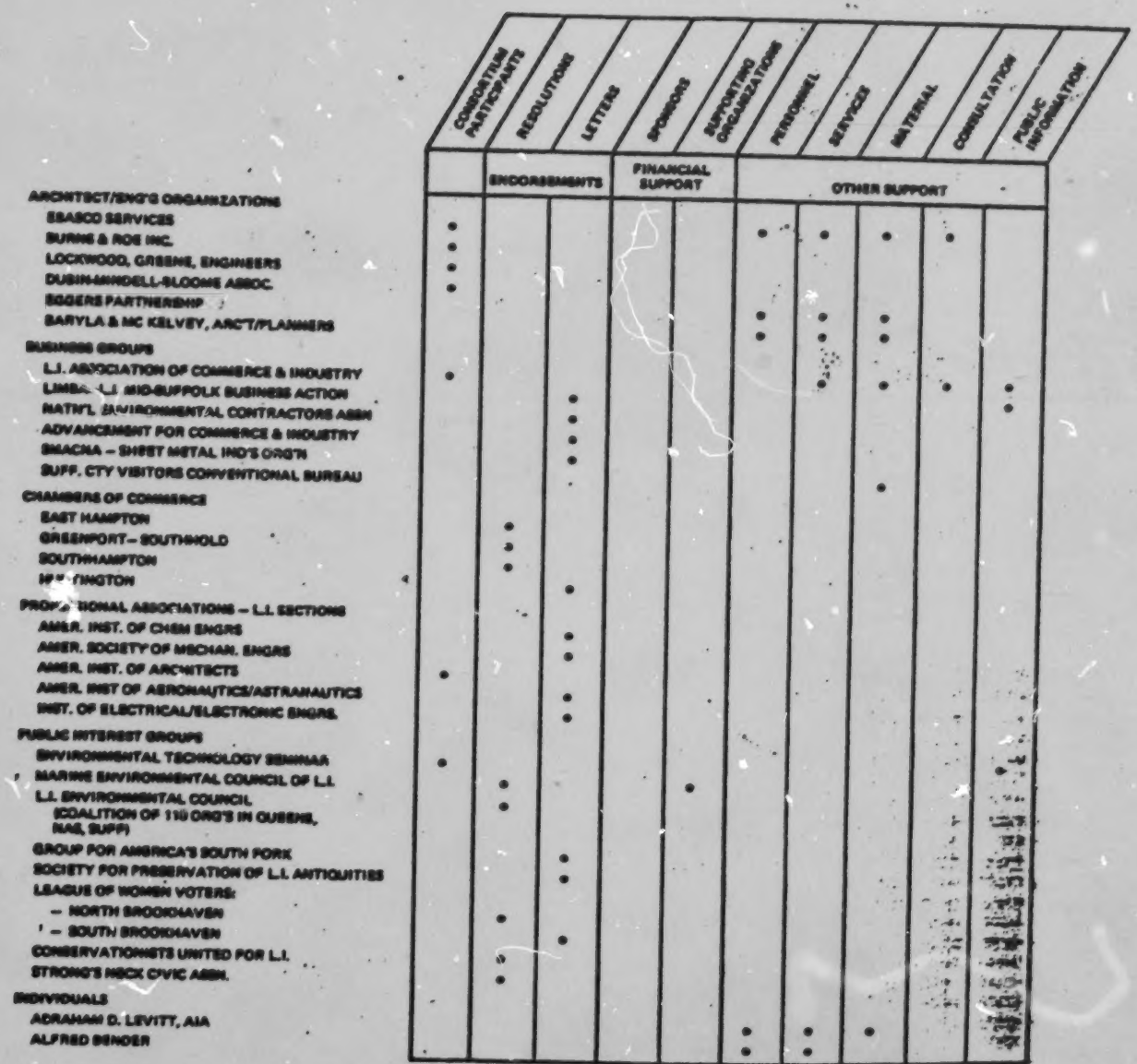
The Princeton Nuclear Fusion Reactor

Princeton University's Plasma Physics Laboratory is the prime contractor to operate a new fusion reactor for the Energy Research and Development Administration. Scheduled to be completed in 1981 at an estimated cost of $228 million, the reactor is based on magnetic confinement of two forms of heavy hydrogen -- deuterium and tritium -- originated by the doughnut-shaped Tokamak Fusion Test Reactor in the Soviet Union.

In March 1976 Ebasco Services, Inc. was chosen subcontractor for construction with Grumman Aerospace Corporation. Ebasco is negotiating with Polytechnic to provide high technology consultants in nuclear engineering, metallurgy, electrical power supply and structural stress factors, and to train construction personnel.

Long Island's Support Base for SERI

Long Island's Support Base for SERI (cont'd)



New courses developed since merger.

The Faculty Senate has approved three kinds of courses designed to improve language capabilities of foreign and native students; four new Certificate programs in Air Resources, Ocean Engineering, Energy Engineering and Policy, and Polymer Materials, and the graduate Energy program in which twelve engineering departments take part.

Starting in September there will be expansion of the Polytechnic's continuing education offerings with Professional Engineer license review courses. Demand is such that there will be two courses given at each of the main Brooklyn and Farmingdale campus centers, as well as others at three other sites: at Consolidated Edison, the U.S. Army Center at 26 Federal Plaza, and at Union Carbide.

There has also been State Education Department approval for the Bachelor of Science degree in Life Sciences, opening up undergraduate majors in eight areas: Bioengineering, Environmental Studies, Psychobiology, Radiation and Health Physics, Computers in Health, Biostatistics, Biomathematics, and Biomaterials.

New Vistas

Polytechnic will not be able to create a real Center for International Technology until it obtains seed money for development and a well qualified Director. The U.S.S.R. has invested tens of millions of rubles to bring students from developing nations to its Lumumba University, while thousands of students from these same countries spend their own money to attend colleges in the United States. By systematically increasing, and providing a more effective array of thoughtfully applied conveniences designed to serve the foreign student, Polytechnic can contribute to this region's international trade and the nation's foreign relations.

Even with good evidence of our having an Institute that is soundly poised for ascent, there are causes for dissatisfaction with advantages which we have not yet been able to bring our students.

The idea of having separate colleges within a larger academic community is not new, but can fill real needs in widening the horizons of Polytechnic students. Such colleges can enhance the social growth of the large majority of students who commute from home to the Institute. Each college would have a distinguished scholar as Master, an

administrator, and a number of associated faculty members who would share in the advising process. Although the colleges would not control the awarding of degrees, as our academic departments do, they would hold regular series of lectures, luncheons, seminars, concerts, exhibits, and performances.

We began, probably somewhat prematurely before a responsive majority of the faculty was properly involved, by bringing Dr. Réné Dubos to Polytechnic. He began discussions on "Man and the Man-made." Through no fault of his, there was initial enthusiasm for this innovation that fell short of being a continuing chain reaction. There has since been encouraging progress in design of interdisciplinary seminars that explicitly relate the human and technological aspects of living. These have forced students to think perceptively about that relationship. One seminar dealing with the human colonization of space; juxtaposition of the technologically familiar with the humanitarian disciplines of psychology, philosophy and ethics struck an enthusiastic response from our aspiring engineers. "Music and Computers" also gave students a feeling of identification with a liberal arts area from which they had previously felt remote.

In the first of his books on the coming depression in higher education, Earl Cheit noted that after cutting maintenance and travel budgets, the first thing to be chopped out by institutions in trouble is innovation. We believe that a significant characteristic of the new Polytechnic is the introduction of what many observers voiced high enthusiasm for and regard as nationally important innovations.

The merger began with established inherited strengths we must keep. Foremost of these has been the placement of nearly all graduates in jobs. Over the past five years, counting alumni of PIB and the new Polytechnic since merger, 92% found work in their fields of choice or went on to graduate school. Industry, government and other graduate institutions welcome our human product because of their fortunate experience with them. We want very much to encourage a stronger thirst for leadership responsibilities, so that the men and women being graduated from Polytechnic will not only seek to be technically reliable but also think in terms of discharging responsibilities for managing

important programs. It should also be possible to encourage a greater interest in entrepreneurship, kindling the desire of students to start new companies of their own and to found new industries.

Most emphasis in this report is on merger negotiations, planning, and finances. None of these would be worth doing if the education of students were not a central concern. How do students at the Polytechnic feel about the education they are getting? Here is what an undergraduate student in chemistry recently said:

> "The best thing about Poly? My professor is working on fibrinogen. I'm working with her, under her supervision, on an enzyme that affects fibrinogen in many ways... possibly inhibiting blood clotting in severe burn cases. I started when I was a sophomore.
>
> "In most places you don't see this kind of work until you are into your Ph. D. I said, 'Here I am.' She said, 'Good, You work here and I'll pay you.' I almost fell off my chair. It's unbelievable.
>
> "She asked me, 'Now what would you like to do?' I know I'll need to know a lot about instrumentation. So I started on an electron microscope, nuclear resonance, anything I want to work with I can, because of the program I'm in."

A senior about to be graduated:

> "There is a course sequence open to all Poly undergraduates -- 450 [illegible] 451. It's a systems approach to societal problems. We [illegible]oped a knee-locking prosthesis that would do basically all the functions of a normal knee instead of a pendulum-type motion. Another did studies for the Transit Authority on noise levels in the subways. Another did microwave communication out at Farmingdale, looking into the feasibility of hooking up the campuses. All of these have been done by undergraduates under a faculty advisor.
>
> "Senior level research is right on the brink of new knowledge: - effects of aphlotoxin on molecules, looking for changes in the shape of DNA, ... effects of fire retardants on polymers, to raise fireproofing standards... isolating ATPA enzyme... time delay drug development. These things aren't available to undergraduates anywhere else."

Has the recent recession-cum-inflation handicapped those students who look to industry? One young man who has been interviewed by recruiters, hundreds of whom visit Polytechnic said:

"Recruiters from industry would rather hire from Poly than from other schools because a person from Poly has learned to live with disadvantages, which means that he will not necessarily have the most up-to-date equipment. But you have equipment. It may not always be functioning, but you learn to fix it so it does function... you learn how to cope. People coming out of here know not just theory, but how to do it."

COLLEGE MERGERS

When and how can they make sense?

At a time when the richest universities feel poor when they cost out what they are sure they must do, and when poor colleges search hard for alternatives to bankruptcy, merger is one extreme answer that at least 24 institutions have used since 1972. Having lived through the first three years following one merger -- combining New York University's School of Engineering and Science and the Polytechnic Institute of Brooklyn to make the new Polytechnic Institute of New York -- our intense yet successful experience may be of use to those who wonder if marriage with another institution is worth their own serious investigation.

Going through the aftermath of an academic merger is like having all your teeth out. When we look back at what has happened, long after the novocaine has worn off, the gains may well be worth the pains.

How much real, rather than creatively advertised, financial trouble is there across the higher educational terrain now? Since 1970 more than 60 colleges have closed, merged, or abandoned their private status to go under public control. State aid to private higher education, now provided by 40 states, is reaching a plateau as competing needs press their claims on state tax income. The American Council on Education has issued an analysis of 100 colleges in dire difficulty. One deputy commissioner who oversees higher education states that 135 out of 259 colleges in New York state are so "deeply in the red" that one out of three "may find themselves with enrollment declines that might cause them to reconsider whether they should continue."

Enrollment declines reflect our smaller college-age population, soon at its peak in all U.S. history, and about to drop in the 1980's. We now have the "largest ever" number of high school students. A larger share of them will be going to state and municipal colleges, and more private institutions will be unable to attract enough students to preserve their separate existences. At this writing, we have been told of merger negotiations occurring between boards of colleges in Alabama, Maryland, and other regions. Even after protracted explorations, some mergers do not come to pass because the parties cannot finally agree. The process of making a merger, and living with one after it goes into effect, absorbs so much of

the physical and nervous energy of all who are directly and responsibly involved that the absence of any careful case histories should be no surprise.

We have constructed what amounts to a taxonomy of mergers, although we dislike thinking of any living and breathing colleges where so many lives and hopes are at stake in terms comparable to a lepidopterist neatly impaling butterflies in careful rows of winged corpses.

Sweating out a merger can be part of the job of breathing new life into a college that was about to die. There is no magic in the legal mechanics of putting two corporations into a different one. No alchemy exists that can summon up a lot of money out of nowhere for meeting payrolls and buying research instrumentation. A renewing process can actually take place, however, when enough able people search carefully into what they decide is worth keeping and then find out how they will go through the lengthy, complicated business of putting reasonable plans into action.

We tell about what has happened in the course of some mergers while outlining our non-necrotic classifications of different kinds. None we cite has the unique fingerprints of the Polytechnic merger we know at firsthand, in which two private engineering schools were forced to come to their agreement under pressure of a deadline set by a State law. Starting with the legal status of uniting corporations, there are five kinds:

Private with private. Back in 1940, in Chicago, the Armour Institute of Technology merged with the Lewis Institute to produce the then new Illinois Institute of Technology. It has surely stood the test of time. IIT had 6, 375 full-time equivalent students enrolled in 1974. Perhaps the best known examples of private-private mergers took place in 1967 when Carnegie Institute of Technology joined with the Mellon Institute to become Carnegie Mellon University in Pittsburgh, and Case Institute of Technology federated (the participants preferred not to use the word merger, even though they have one corporation and one board) with Western Reserve University to form greater Cleveland's Case Western Reserve University.

Private-public. The largest one in the northeast United States was the 1962 merger of the University of Buffalo, replete with its graduate schools of medicine, engineering, and other professions, into the State University of New York system.

SUNY-Buffalo was the brain child of University of Buffalo Chancellor Clifford C. Furnas. It seized advantage of the SUNY master plan to establish a fourth big university complex in the State, has cost an asserted

$100+ million to build, staff, equip, and operate a new campus during a period of rapid expansion that may not return. The scale of costs made state legislators sure they did not want their repetition. During negotiations for a merger of SUNY with the Polytechnic Institute of Brooklyn that did not happen, the SUNY-Buffalo experience had a chilling effect.

Public-public. In 1948 SUNY took over eleven teachers colleges and six agricultural and technical institutes that had been administered by the State education department. In 1950 five institutes of art and science became part of the growing SUNY system. The most recent amalgamation of this variety was in the nation's capitol in 1975, when the National War College and the Industrial College of the Armed Forces became the University of National Defense. While an elaborate Pentagon ritual may have preceded it, in terms of the national defense budget-making process that merger may have been comparatively quick and simple.

Proprietary-nonprofit. Brandywine College in Wilmington, Delaware and Widener College in Chester, Pennsylvania are reportedly negotiating a merger in 1976.

Proprietary-proprietary. National Systems, Inc., Newport Beach, California, the company that has a chain of educational centers largely devoted to preparation for business occupations, acquired Bryman Sawyer Schools in 1976.

Mergers between institutions of the same legal status are more readily brought to birth than those between public and privately controlled colleges. Merger negotiations between SUNY and Brooklyn Polytechnic that went on for three years, and proposals for a City University of New York--Brooklyn Polytechnic merger and for a Consolidated Engineering Center involving SUNY, CUNY, and four private institutions all proved abortive. Although the Polytechnic-NYU School of Engineering & Science merger took two rounds of negotiations, with the first reaching an agreement between their Presidents only to have the NYU-SES faculty decline the employment contracts offered them, it did finally happen.

When private and public institutions merge the result has always ended up under public control. As costs keep climbing, some venturesome and resourceful private board may see what it can do with one or more previously tax-supported institutions. Considering that private corporations often compete for larger government contracts, and that the

budget-making process with successive stages for approval from state administrative agencies and legislative committees is not as risky as the whole repertory of fronts on which a private college has to struggle for resources, we doubt if such pioneering will be frequent.

The simplest mergers merely recognize a de facto situation, as when Harvard and Radcliffe gave legal approbation to what had long been "co-education in practice, but not in theory."

Dr. John R. Haines of the New York State Education Department says that because mergers turn out to be so complicated, and so time-consuming to bring about, his department encourages institutions to consider other forms of cooperation. The affiliation between Parsons School of Design and the New School for Social Research, which continues to have two separate boards whose membership is said to be identical, is tantamount to a merger. The nicety that makes their rapprochement unusual is that they preserve their separate corporate identities.

Our own Polytechnic Institute of New York merger demonstrates how different two private institutions can be. The old "Brooklyn Poly" had been a separate, independent entity since 1854. NYU's School of Engineering & Science, henceforth called SES, was just as long-established but it was only one of fifteen schools that made up a University. Both were financially ailing, but on an altogether different order of magnitude. NYU's total 1972-73 expense budget was $85,702,067. That is more than what it cost to run the United Nations. It was nearly $12 million more than income. The NYU President and trustees decided that the only way to save the University was to sell its uptown University Heights campus in the Bronx. After paying off mortgages and other debts, there would still be $30+ million for improving the endowment that has shrunk during earlier years of deficits.

NYU's engineering school did not have much to say in the matter. It was located in sumptuous new buildings up on the Heights. Among these were the $10+ million Tech II designed by Marcel Breuer, making SES possibly the most up-to-date engineering school plant on the East coast. SES was managed by a Dean, who reported to a Provost on the Heights campus. When the State passed a law authorizing purchase of the campus for Bronx Community College, and making merger between SES and Brooklyn Poly part of the package, the NYU negotiators came from the central downtown administration. The sale of the property for $80+ million was too important to let fall apart.

Our Polytechnic now is a merger in the sense that both Brooklyn Poly and NYU-SES joined into what is a new Institute with a legal identity of its own, rather than becoming part of a larger multi-school corporation as SES used to be and as the University of Buffalo did when it merged into the SUNY system.

Some people say that merger is a misnomer in the case of the new Institute. They are sure what took place between SES and PIB should be more appropriately called a takeover or shotgun wedding. The enabling 1972 State law provided "that appropriate programs and faculty of the New York University School of Engineering and Science should be merged into the Polytechnic Institute of Brooklyn" (emphasis ours).

These critics feel that merger normally means the combining of approximately equal or equivalent parts. At least three dictionaries disagree. In both law and business practice a merger takes place when a larger estate or company absorbs one or more smaller ones.

Quite different are other forms of cooperation. An affiliation is a linkage that lasts only as long as both parties benefit. A consortium is a voluntary formal organization of three or more institutions who agree to do things for one another. They frequently incorporate, as the twelve members of the Brooklyn Educational and Cultural Alliance have done. Notable consortia are the Five Colleges in western Massachusetts (Amherst, Hampshire, Mount Holyoke, Smith, and the University of Massachusetts' Amherst campus), the Claremont colleges in California, and the six institutions that form the Atlanta University Center complex of mostly black graduate, professional, and undergraduate schools.

Corporately, a tighter variant of consortium is the network whereby satellite units use the accredited degree-granting authority of a parent institution. Antioch College in Yellow Springs, Ohio, has virtually exploded into 24 centers. They are scattered across the map at such locations as Austin, Texas; Baltimore; Beckley, West Virginia; Cambridge, Massachusetts; Columbia, Maryland; Faribault, Minnesota; Harrisville, New Hampshire; Philadelphia, San Francisco, and Washington, D. C.

Affiliation is the loosest cooperative arrangement. In degree of permanence and difficulty to bring into being, consortium is a step higher, network higher still, while merger is the most complete and toughest to achieve. If one reverses the flow, going from the degrees of fusion to

fission, along the way one can see such divisions as the spin-off from a parent institution of free-standing centers. Some years ago the U. S. Department of HEW pbulished a list of 3, 200 independent research centers. Many originated as units of universities and colleges whose directors were restive or feisty enough to secede.

Case Western Reserve's preference for the word federation rather than merger reflects the consciousness of autonomous power held by its component schools, all of which have a single Board, Chancellor, and administration.

Merger is a marriage, affiliation more like kinship. When one affiliate is in financial straits, the others have no legal commitment to help it find the way out of trouble. Consortia are extended families. A network is a constellation of tribes. Barnard presents a different pattern yet, a symbiosis, with a large university, Columbia.

We can also classify mergers by the functions of their partners. Ours may have been easier to put into effect in some respects, and more arduous in others, because SES and Brooklyn Poly were primarily engineering schools. Even so, our rosters of faculty and students' majors were far from congruent. We differed because SES obtained liberal arts and "pure" science instruction from NYU's University College with which it had shared the sold-off Heights campus while Brooklyn Poly had its own Physics, Chemistry, Mathematics, Humanities, Modern Languages, Social Science and the like.

When Miami University merged with nearby Western College, both in Oxford, Ohio in 1974, one simply had two four-year undergraduate coeducational schools getting together. In 1974 the Gartett-Evangelical Theological Seminary in Illinois looks as simple, at least on the surface.

When the Mellon Institute, a research organization, merged with Carnegie Institute of Technology, an engineering university, in 1967, the result was a union of dissimilar or complementary parts. In 1974 the Institute of Advanced Studies in the Humanities, a coeducational undergraduate college merger into the graduate Jewish Theological Seminary of America was another blending of this sort.

Functionally the 1967 Case Western Reserve merger was a hybrid. The partners were similar in their having Physics, Chemistry, and Mathematics departments; they were different in Case being an engineering

school while Western Reserve had a four-year liberal arts college as well as graduate professional schools.

The prospect of success depends on leadership, program worth, demand for services, and perceived importance to constituents. When these elements are approximately equal among the partners, hybrid mergers may be brought about more readily than dissimilar or complementary ones. Our guess is that dissimilar and complementary mergers are attended with less tension than those joining similar entities.

Dissimilar programs can, but do not necessarily, bring complementarity. Redundant departments and sub-departments have a grim, implacable will to survive. Hybrid mergers possess potentially heightened interest that can stir cooperation and support by the infusion of diversity.

We have yet to find a merger that did not have as its basis a fear of what would happen if merger did not take place. Even the Carnegie-Mellon merger was inspired, many believe, by the severe financial problems of the neighboring University of Pittsburgh, which has become a state-related institution deriving a 35 percent part of its budget from the legislature.

Many more mergers are negotiated than are brought to fruition. Brooklyn Poly looked into at least five possibilities and NYU-SES investigated three before Albany lawmakers locked them together. We group mergers into three kinds of outcome.

Happened and succeeded. In 1923 Cookman Institute for Boys, in Jacksonville, Florida and Daytona Normal & Industrial Institute for Girls in Daytona Beach formed into what has since been Bethune-Cookman College. The University of Bridgeport (formerly the Junior College of Connecticut) merged with Arnold College in 1953. Case Western Reserve's vitality is shown by its early 1976 kick-off of a $220 million fund campaign, with $70 million pledged at the time of its announcement.

Happened and failed. Kansas City University merged with York College in 1928. The merged entity died in 1955, transferring its records to Western College in Lemars, Iowa.

Failed to happen. Like books that are talked about and whose manuscripts are never completed, these are much more common than merged new institutions. Dr. Eldon Smith of the National Council of Independent Colleges and Universities says that negotiating a permanent new structure

is such a punishing process that many institutions get to the verge of merger but do not show up at the altar. Even among these there are two varieties:

...and one or more parties died. Mills College tried to merge with the New School for Social Research. They did not agree. Mills closed in 1974.

...and one near death revived. Pennett College and Cazenovia College, both in New York State, did not find agreement. Cazenovia was in deep trouble, but failure to merge helped spark the interest of persons who have since helped it substantially.

Affiliations and consortia are entered into for educational purposes. They involve sharing facilities, teaching and learning resources, providing more to students than the members can normally afford to do separately. They do not have a merger's irreversible totality -- the legal death of one or both parties in the creation of a new one. It is a drastic act.

The board of an institution is unlikely to take this step unless its survival is at stake. Boards want to conserve what they cherish. They are jealous of their school's identity, and want to maintain it. As negotiations go down to the wire, there can be dispute over what the name of the new institution will be. Ursuline-Bellarmine has been merged over a decade now, and it is finally about to be plain Bellarmine.

Voting for merger is crossing a Rubicon. Institutions do it with reluctance, only when they see salvation or an enormous advantage. When gains are marginal they will not risk merger.

What elements can assure that merger is worth the pain? Our hindsight suggests that management, money, faculties, students, alumni, the state, academic characteristics, and community support are the variables anybody considering a merger should examine.

Management means the team that will take charge of the actual process of consolidating faculties and supportive staff, melding together the facilities and services required for infrastructure, while at the same time solving the problems that made the merger necessary.

This usually requires first aid to staunch avertible expenditures while generating renewed and new income. Here we must make sure that top management and middle managers are not in conflict. Budget cutting has to excise fat without sacrificing bone and muscle essential for making the new institution thrive educationally.

However able the managers are in a business sense, someone must also be the educator who can lead a community of scholars. Robert M. Hutchins wrote a classic essay saying that such a person must exert courage, defined as the habit of making decisions; possess fortitude in willingness to bear their consequences; insist on justice -- equal treatment unto equals -- and manifest practical wisdom in knowing when particular actions are desirable and needed. Years later he decided that a fifth quality, patience, is as vital as the others combined, because the process of involving those who must carry out new policies is quintessential if reforms are to endure.

Following a merger agreement, it has become common for search committees to find new senior officers from outside the institutions. General George C. Marshall said that the way to get new policies is to get new men.

Our Polytechnic merger agreement may have gone too far too soon in the quest for new academic leadership. It provided that every position from Department Heads up through Deans, and Provost had to be at search following the merger. Every incumbent in these posts was made a lame duck at the very time that stability was essential. In retrospect it appears a two to three year moratorium on such across the board actions from the date a merger becomes effective would have made better sense.

However, enough capable administrative personnel is needed to focus on productivity (even allowing for the fact that cost effectiveness in higher education is in its early mewling infancy) and to generate more income from a spectrum of sources. If an apparent surplus of faculty results from merger, some of those who can should be put to work on the plethora of new tasks generated by the necessity to make the merger work, including the need for adequate student services, and the development of new programs essential to the success of the new institution.

Quality of middle management is at least as important as the number of people. They must be able to resist pressures, think on their feet, be thoughtful where individual students and faculty members can benefit from their help, and have a sense of urgency.

Governance is a pretentious synonym for government. It means direction that knows where it is going, and control that is exerted with consent of the governed. At its best, leadership brings forth the best effort

of those whose work makes the difference between inspired and pedestrian performance. At its most dismal it is unpredictable, arbitrary, officious, unjust, and destructive. In an academic merger the persons on top had better be stable, accountable, able to communicate, hospitable to all reasonable viewpoints, and indefatigably energetic.

Finance is simply money. Joining two deficit operations is likely to compound rather than solve their problems. In theory, merger of two institutions that have separate top administrations, such service staffs as those who purchase and maintain, and other inescapables often dismissed as impedimenta, ought to bring savings. In the Polytechnic merger it soon proved not that simple.

Any merger should be underwritten with enough front money. The new institution needs investment for creative efforts that can prove well worth their costs and contribute toward bringing budgets into balance within a foreseeable period; to underwrite new ventures, including some that are experimental and thus carry risk; and to fulfill commitments over a long enough period of time. Lacking this, the merged new entity is unlikely to amount to much.

The Polytechnic merger had a sum from New York State for its first year that was about the size of the annual Brooklyn Poly deficit before the merger, despite the fact that the new institution was also taking on the large burden of the SES deficit. Yet the State of New York was being generous. Brooklyn Poly and Eisenhower College may be the only two private institutions that have received special emergency state aid in recent years. Next to the size of the new Polytechnic's obligations, however, the new money was like giving a horse one oat.

The enabling state law required the merged Institute to have a balanced budget by the third year after merger. The State Education Department served as mediator during merger negotiations. It insisted on a plan that projected, at least on paper, income in amounts from various sources that would equal anticipated expense. Some parts of the projection turned out to be over-optimistic -- such as the number of SES students who would transfer to the merged institution, and the amount of SES contract research that would go to it. It was also unrealistic to assume no pay increases for several years after the merger.

Some contingency funding ought to be made available to enable a merged institution to continue when it renders a considerable public

service and is doing all it can to meet targets that would otherwise prove unrealistic. Contingency funding is needed simply because the planning art is no more infallible in education than in business and government. A regional or national fund to assist important mergers, against which newly combined institutions could borrow, could make use as collateral of physical assets carried on their ledgers for scarce venture capital and for less clogged cash-flow. The pay-off in newly merged institutions being able to improve learning for their students and to fulfill other important roles in research and public service is worth consideration. In the case of private institutions, the ability to produce graduates at less cost to tax-payers than at many public universities (as has been argued by numerous private colleges) is also an important outcome of a merger.

The key financial variables are obvious: anticipated income and expense of the merged entity, and working capital to pay for forward motion. Given enough money and time, along with an appetite for informed judgments on the kinds of personnel and programs worth buying, quality education is purchasable.

Deficit thinking can lead to paralysis and academic rust. Cost cutting should have maximum involvement of those whose budgets will be cut, following the principle of fairly shared sacrifice. There are abrupt limits to even the wisest parsimony. When an excess of infuriating small annoyances results, the cost in impaired morale can be so damaging as to precipitate an institution in a downward spiral.

Will enrollments at the merged institution at current tuition rates permit it to maintain a critical mass of quality curricular offerings? Will there be enough student aid to accept students whose competence will flourish in the merged college but cannot afford the tuition? If projections fall short, what alternative actions can the new Board and administration take to make up for what was counted on?

Desiderata for fund raising are familiar: (1) programs worth buying, able to stand up to sharp scrutiny; (2) leadership committed to specific money goals and able to make pace-setting gifts themselves; (3) access to enough prospects able to elevate the sights of those who otherwise contribute marginally; (4) enough workers to do the asking and follow-through; (5) a cogent plan sequentially linking leaders, prospects, and workers, first aiming at the primary gifts whose size makes the difference between

reaching the goals and not; (6) communications that bring about a sense of participation and recognition, and (7) investment in experienced staff support.

Faculty members. Nowhere does the onset of a merger cause more perturbation than those whose jobs are at risk. Unless they feel they will benefit, some of the ablest and most mobile accept offers to go elsewhere.

When one faculty enjoys higher salaries than the other, equalization measures are unavoidable. When one has a union and the other has not, a new election that polls majority wishes of the enlarged faculty is plausible. The turmoil attending this can heighten militance.

A period of two or three years' grace, deferral of even wholly warranted demands for improved salaries and fringe benefits, can make a decisive difference in the capacity of the new institution to develop its fund-raising potentials. Debate over tenure and mechanisms for severance that observe the law and due process can seem endless. Advice from sources that are not willing to speak openly before faculty, administration, and board are suspect. Prescribing courses of action, without sharing the responsibility for their consequence, is irresponsible.

At the new Polytechnic we found that normal turnover and attrition absorbed what was an excess of faculty in the first 30 months after merger. Having some professors take early retirements and terminal sabbaticals cost money, but was advantageous to both parties.

Merger negotiations and their aftermath inevitably increase "political" activity among faculty people who see changes as threats or see opportunities for personal advancement. There is a time for adjustment to new people or to rules that are new to some. Work with more or different people in an accustomed setting, or getting used to different offices, classrooms, laboratories, equipment, and library facilities takes time.

The board and administration can make the most discomforting changes tolerable if they can suffuse the merger with an atmosphere of affirmation. Mere exhortation, with the purest of intents, can at times aggravate. Furnishing evidence that the situation is in fact looking up can be more persuading.

During hard times in the academic marketplace, objective circumstance should put a higher premium on institutional loyalty than in times when most scholars have more reasons to identify their highest interest with their disciplines.

Students in time of trouble may tend to be viewed as needed bodies, paying customers, rather than the primary reason for an institution's existence. Services provided to reduce drop-outs may have motives of preserving income, rather than a conviction that student failures are a loss to society. Yet if they work effectively, they are more useful than high motivation that doesn't yield its desired result.

A private college is at times tempted to become more solvent by lowering standards to serve a larger market. This may be a perfectly rational decision, but should be taken -- if it is taken -- explicitly rather than implicitly, and with a full understanding of its consequences for the future of the institution. In the case of technical professional schools, however, such a course can be easily counterproductive, if it endangers the institution's standing among employers and research funding agencies.

Parties to merger should pay more attention to student needs and preferences than they often do. For instance, in timing a merger, students want to know before the end of their Fall semester that they can continue into the next Fall term. The Polytechnic merger agreement was very considerate of the students in providing for continuing all programs NYU-SES students had begun, even though it added cost to the new Institute's operations. The agreement also anticipated expansion to serve students in Long Island and Westchester, but failed to take into adequate account time needed to obtain Board of Regents authorization.

Alumni tend to resist any merger that sullies a nostalgic vision of their youth. The first merger agreement Brooklyn Poly signed with NYU called for the latter to turn over lists of SES graduates. An SES alumnus sued NYU enjoining the institution from doing so. Subsequently NYU President Hester wrote a circular letter to 15,000 SES alumni, to which 1,200 answered saying they approved having their names on the merged institution's mailing list.

The participation of alumni associations in negotiations would probably not expedite them, but keeping association members posted on their progress improves the acceptance of the merged institution. It also helps in the undertaking, after the merger, of a vigorous program of services to the alumni. Thus the new Polytechnic is expanding such services to alumni as continuing education (e.g., through a course on How to Prepare an Environmental Impact Statement), job placement, and other programs of timely professional interest. When the identity of a merger partner

appears to be lost by having the other school swallow it, as happened when NYU cut SES adrift, disaffections among the alumni should be expected, unless steps are taken to avoid it.

Role of the State. New York State had many arms in, on, and around the Polytechnic merger. Some arms helped, others hurt, while still others intervened later as healing mediators. Siva, the Hindu god of destruction and regeneration may be the right analogy. One branch of SUNY seriously recommended that an emergency state subsidy to rescue Brooklyn Poly from bankruptcy be used only to pay for transfer of its workd renowned graduate faculty to the SUNY staff. The legislature saw to it instead that the sale of the NYU uptown campus was tied to effecting preservation of both engineering faculties. And the State Education Department tried patiently to guide merger negotiations that were sometimes acrimonious.

Governor Rockefeller was friendly to both parties, yet preferred to have the Regents make educational decisions. Successive SUNY chancellors and state Commissioners of Education welcomed and threw monkey wrenches into the merger of SUNY with either institution. Brooklyn legislators seemed to some SES partisans like omnipotent powers of darkness, and to Brooklyn Poly as real Samaritans when the going was roughest.

What outcome would best benefit the entire region was, all told, a very secondary consideration in the merger. The overriding need of the greater New York metropolitan area for an engineering institution comparable to M. I. T. and Caltech was not a significant factor in the state actions that made the merger possible. Neither a realistic schedule of financial support was provided, nor was sufficient attention given to the physical plant needs of the new institution. For instance, NYU's Tech II with its advanced engineering facility may have been a useful component of the physical plant of the new institution. (We were indeed ready to find its occupancy by Bronx Community College a total misuse of that facility, until we saw some of the College's 13,500 students avidly making impressive progress at a modern learning resources center installed in what had been the SES storage basement.)

Here we have the spectacle of valid claims on regional resources that are in collision. The unresolved issue is how New York and adjoining states can solve problems of creating new industries and of bringing energy and pollution challenges under control, while at the same time keeping

higher educational opportunity wide-open to deserving qualified poor students.

Learning and Research. In a merger, negotiating parties should try to look ahead. What will the proposed new institutions do for students, faculties, teaching and research programs? What impact will it have on the region? While these questions are not always easily answerable, some objective yardsticks are available. These are approved powers to confer specific degrees in particular fields, accreditation by established regional and professional bodies. Internal data also available are the size and trends of full-time equivalent faculty and their qualifications; full-time equivalent undergraduate and graduate enrollments and degrees conferred; research productivity (at least in raw number and magnitude of grants and contracts); major foundation support; books, monographs, and papers published, reprinted, and translated; consultancies, awards, honors, elected offices, and invited lectures; the placement of recent alumni at graduate schools, in industry, government, and on other faculties.

In comparing the merging institutions, the average and mean scores of entering students on such standardized tests as the SAT, ACT, PSAT, and GRE, the number of entering students who receive merit scholarships are all imperfect data -- called by George Schuster "our educational divining rods" -- but within their limits they do have meaning.

The planners of a merger ought to aim at bringing into being an institution whose academic purpose and expected performance are established as reasonably as possible on the basis of the characteristics of the merging entities, and can be periodically monitored. The extent and depth of inquiry into gaps between stated purpose and performance, the analysis of avoidable drop-outs, and the examination of interaction between teaching and research all deserve more attention than they get.

The Community. Even if an institution has strong loyalty of its inner family of students, faculty, parents, and alumni, it can be in peril if there is failure to cultivate other important "users" of its services. These are employers of recent alumni, officers at research funding agencies, prospective students still in secondary school, the guidance counselors and teachers who influence them, and finally the government departments, industries, and civic interests that can benefit from what scholar-teacher-researchers working in concert do.

After the merger Polytechnic mounted a major effort to the community: through the media, and by direct exposure of its people, programs, and work-in-progress to these current and potential "users."

A merged institution inherits all the mixed strengths and defects of the partners. As often as not, their troubles owe something to their neglect of the communities where they are located and of their constituencies. Early after a merger, renewed leadership ought to seek out those whose support can aid the newly joined institution. Its spokesmen should offer the college as a resource that can help meet perceived needs. It should do this not merely to please but to strengthen academic programs while contributing to the economy and life of the area.

Instant creation of far-flung supporting constituencies is not possible. Step-by-step application of practical imagination can attract support that is likely to continue.

A merger can indeed be a renascence. It should proceed with adherence to democratic procedures and respect for every participant's rights. It should never risk the kind of chaos, however, that the Spanish novelist Ramon J. Sender depicted in his novel Seven Red Sundays about a revolt by nobly motivated but disorganized anarchists against the young Spanish Republic. A learning community or institution needs to entrust some well defined responsibility to leaders who will lead, as they work as hard as they know how to meet specific needs decisively and in an orderly manner.

For centuries men have had to contend with contradictory needs for self-government that governs effectively and fairly. We are indebted as Montesquieu said in the early paragraphs of the eighth book of The Spirit of the Laws, "The corruption of every government generally begins with that of its principles.

> "The principle of democracy is corrupted not only when the spirit of equality is extinct, but likewise when they fall into a spirit of extreme equality, and when each citizen would fain be upon a level with those whom he has chosen to command him. Then the people, incapable of bearing the very power they have delegated, want to manage everything themselves, to debate for the senate, to execute for the magistrate, and to decide for the judges.
>
> "When this is the case, virtue can no longer subsist in the republic. The people are desirous of exercising the functions of magistrates, who cease to be revered. The

deliberations of the senate are slighted; all respect is then laid aside for the senators, and consequently for old age... This license will soon become general, and the trouble of command be as fatiguing as that of obedience."

NEEDED: A PREDICTIVE INDEX

There is need for a predictive index of probable success in merger situations. This should assign appropriate weights to the factors we have mentioned thus far -- governance in terms of Trustees, top and middle management, and finances -- for assay of short-term prospect of survival. It should also assign scores or values to the role of the State; community involvement, perceptions, and assistance; faculty; students; academic characteristics, and gestalt of each partner that estimates the relative unity shown through willingness to bear up under adversity and discomfort and to take part in work for the benefit of the entire institution.

The short-term prospect for success should combine essentials for survival with auguries of improved longer-term quality education. Some mergers may have a quite good short-term outlook, but questionable assets for later quality outputs.

For the short-term, we define success largely in terms of raw survival for three years after merger. Four primary determinants are:

trend toward elimination of operating deficit, if these exist;

whether the market value of endowment -- in the case of a private institution -- is meaningfully up or down;

is full-time equivalent enrollment up or down?

has the student-faculty ratio become stabilized?

We suggest four other indices relating to academic quality when gauging short-term changes of a merger's success:

is funded research up or down?

has student body attrition -- in percentage of drop-outs, and transfers to other colleges -- gone up or down?

is there measurable progress toward a critical mass of curricular offerings in each major division embracing a group of related academic departments?

are acceptance at graduate schools and employment of graduates in their fields of preference on the rise?

Morale can be crucial

An institution usually has a mix of positive and destructive impulses. These defy calibration, yet can pivotally affect the confidence and actions

of students, faculty, administration, board, alumni, and constituents. Morale owes much to the spirit engendered by top management.

Prior to merger, morale often ranges from uncertain to poor. The atmosphere in which merger negotiations is conducted can either poison an institutional esprit or lend reasons for hopeful and constructive ideas and plans. In general, if we can extrapolate from our experiences, the shorter the period the better.

At worst, a merger precipitates an avalanche of resignations by Trustees, administrators, and faculty, followed by an epidemic of student transfers. At best there is a series of reasons that cause individuals to feel they are part of an important new enterprise, so that they identify their individual self-interest with the fate of the renewed institution.

People can cheerfully put up with numerous annoyances and inconiences when they regard these as trivial next to the gains they feel are probable. Individuals are capable of drawing upon their personal reservoirs of potential strength when they are reasonably sure that burdens are fairly shared,

One symptom consists of many small thoughtfulnesses exhibited by members of an institutional family. A free flow of information (bad as well as good, so long as it continues to be believable), recognition of exemplary work, and the lubricant of some understanding humor can serve as catalysts.

Retrospective appraisals should be made periodically -- say after two, five and ten years. Once continuing existence is assured, there can -- and should -- be increasing emphasis on quality performance and prospects for upgrading that quality. State Education Departments and philanthropic organizations concerned with quality educational performance should give attention and assistance during this crucial decade, in the public interest.

Certain specific yardsticks are worth mention. Foremost are external measurements of student achievement. It is useful to compare Scholastic Aptitude Test levels on entering freshmen with Graduate Record Examination scores of seniors. In this process, one should, however, take into account the steady drop in average verbal and mathematical test scores of high school seniors in the ten years since 1966-67

through 1974-75. Then examine whether the institution has reduced its attrition rate without letting its degree and course requirements slacken.

It should be possible to arrive at a vector matching quantity of B. S., M. S., Professional, and doctoral degrees conferred against student-faculty-ratio. Ideally, it would also be desirable to assign qualitative ratings to specific phases of instruction, determining how and why the same degree from one institution represents higher cognitive achievement than from another.

Because the economy and job markets are cyclical, at times there may be fewer Ph. D. candidates for reasons that have nothing to do with students' ability and aspirations on one hand and institutional performance on the other. Still, it would be desirable to obtain information from employers on how well graduates from different institutions meet professional demands and earn ascending responsibilities.

For the present, we suggest a predictive index for the progress of a merged institution after it has gone through its shakedown period.

Grounds that assure the stability of the new institution include:

- keeping operating budget in balance
- increased student enrollment
- increased market value of endowment
- obtaining larger annual contribution totals from
  - government
  - alumni
  - corporations
  - foundations, organizations, and other friends
- obtaining larger total capital gifts and bequests
- growth in research funding per faculty member
- funding retirement plan
- preventive maintenance of facilities.

The academic parameters should also be considered, such as whether:

student-faculty ratio has stabilized

student attrition is reduced without decline of standards

balance between tenured and non-tenured personnel is being achieved

average FRE score has risen or remains above average nationally

opportunities for independent and self-directed study are on the rise

programs to improve teaching are yielding evidence of progress

faculty research output continues to receive recognition by national agencies and professional societies

community, state, regional, and national bodies look to the institution as a resource for finding answers to their problems.

Ironically, morale is not as vital to the fate of an institution after it is financially stable and putting forth high quality instruction and research. By the time it is sought after by more prospective students and faculty than it can handle, there can be all manner of tensions and dissensions without serious damage to its capacity to go forward. In the immediate wake of merger, however, esprit can make a tremendous difference -- determining if the various components cohere into a vital gestalt.

APPENDIX A

AGREEMENT BETWEEN NEW YORK UNIVERSITY

AND

POLYTECHNIC INSTITUTE OF BROOKLYN

DATED: JULY 26, 1972

AGREEMENT OF MERGER OF PROGRAMS AND FACULTY

made and entered into this 26th day of July, 1972 by and between New York University ("NYU"), having its principal office at 40 Washington Square South, New York, New York, and Polytechnic Institute of Brooklyn ("Polytechnic"), having its principal office at 333 Jay Street, Brooklyn, New York, both being educational corporations of the State of New York.

W I T N E S S E T H :

WHEREAS, Chapter 463 of the Laws of 1972 of the State of New York requires that appropriate educational and research programs and faculty of New York University School of Engineering and Science be merged into Polytechnic not later than July 1, 1973; and

WHEREAS, the Executive Committee of the Board of Trustees of New York University by resolution dated June 19, 1972 has authorized the Administration of the University to discontinue the NYU School of Engineering and Science after August 31, 1973, and to notify the faculty of that School accordingly not later than August 31, 1972; and

WHEREAS, the parties hereto desire to implement the provisions of the statute at the earliest opportunity;

NOW, THEREFORE, in consideration of the mutual agreements herein contained, the parties hereto represent, covenant and agree as follows:

1. Declaration of Policy

Each of the parties hereto deems it advisable to merge appropriate educational and research programs and faculty of the NYU School of Engineering and Science into Polytechnic. All actions required hereunder by this Agreement shall be taken as promptly as possible, and strictly within the timetable set forth hereinafter.

2. Objectives

The parties hereto agree that on the Closing Date hereafter specified there shall be merged into Polytechnic the educational and research programs and faculty of the NYU School of Engineering and Science as hereinafter provided; and Polytechnic agrees to accept such educational and research programs and faculty and devote the same to its corporate purposes and to the objectives of this Agreement.

3. Procedure

The parties hereto agree that this Agreement shall be carried out in the following steps and according to the following timetable:

(a) Execution. The parties will execute this Agreement on or before July 26, 1972, to signify their accord as to the general terms and conditions for accomplishing the stated objectives.

(b) Offer by Polytechnic. On or about July 28, 1972, Polytechnic will mail a written offer of appointment to members of the faculty of NYU School of Engineering and Science in accordance with the provisions of paragraph 4 of this Agreement.

(c) Effective Date. This Agreement will be deemed to be in full force and effect, and both parties will be bound thereby, on or before noon September 1, 1972, if by August 28 the conditions of paragraph 8 (Substantial Performance) hereunder have been satisfied. The parties agree that if the conditions of said paragraph 8 have not been satisfied by noon September 1, 1972, this Agreement shall be null and void.

(d) Defeasance Clause. The parties further agree that either party shall have the option to declare that this Agreement is null and void, notwithstanding its having entered into full force and effect as provided in subparagraph (c) above, if the financial plans of Polytechnic required by law to be submitted on or before October 1, 1972, are not approved by the Regents and the Governor on or before

December 1, 1972. In the event of such defeasance, the provisions of paragraph 10 (Defeasance clause) hereinafter shall apply.

(e) Closing Date. After compliance with the foregoing steps and timetable above set forth, this Agreement shall be consummated on or before June 30, 1973 as provided in paragraph 13 (Closing) hereunder.

4. Faculty

The parties agree that, for the purposes of this Agreement, the voting faculty of NYU School of Engineering and Science shall comprise the individuals holding the ranks of Professor, Associate Professor, and Assistant Professor who serve on a full-time basis as of the date of this Agreement (as listed on Schedule A attached).

Polytechnic agrees to make, on or before July 28, 1972, a bona fide offer in writing, on an individual basis, irrevocable until the August 28 acceptance date hereinafter referred to, to each and every member of the faculty of NYU School of Engineering and Science, listed in Schedule B attached hereto, for appointment to the faculty of Polytechnic on such terms and conditions as

Polytechnic may deem appropriate. Polytechnic agrees that each such offer, as a minimum, shall be for appointment beginning September 1, 1973 at the individual's rank for the 1972-1973 academic year, at the current NYU salary for the nine-month academic year, and shall specify the tenure status to be accorded or the basis upon which tenure may be earned. It is understood that professors who attained tenure at NYU before September 1, 1969 will be offered tenure by Polytechnic, and that other tenured professors at NYU will be offered employment contracts for at least two years. In addition, Polytechnic will provide, or make available promptly upon request, full information concerning academic appointments at Polytechnic, including but not limited to that contained in the Polytechnic Code of Practice and the By-Laws of the Faculty in such detail as may enable the recipient to judge the nature, terms and conditions of his proposed appointment. Each offer shall be accompanied by a statement that the recipient is required to indicate in writing his acceptance of the offer, to be received by Polytechnic not later than the close of business on August 28, 1972, together with an explanation of the circumstances, if any, in which Polytechnic may have the option under the terms of the Agreement to avoid or terminate its obligation

to faculty members who accept the offers made by Polytechnic. In the event such offer is made to a principal investigator responsible for a research or training contract or grant listed in Exhibit C attached hereto, Polytechnic may at its option require that the acceptance by such principal investigator include the execution of such documents and the performance of such acts as to insure the transfer to Polytechnic of such research or training contract or grant.

5. Clerical and Research Staff

The parties recognize that it will be advantageous to their merged educational and research programs to have the continued assistance of the experienced clerical and research staff currently employed at NYU School of Engineering and Science. Polytechnic accordingly agrees to give priority for employment to members of the non-academic and research staff of the NYU School of Engineering and Science (provided they have qualifications comparable to those of other candidates) on the same basis as that given to those former employees on such staff of Polytechnic who have been terminated by Polytechnic since September 1, 1971. Any member of the research staff currently employed by NYU who is offered employment by Polytechnic under the provisions of this Agreement will have the same rights, privileges,

obligations, and responsibilities as other members of the Polytechnic research staff.

6. Students

With respect to students who transfer from NYU School of Engineering and Science to Polytechnic, the parties agree as follows:

(a) Degrees. Students currently registered at NYU School of Engineering and Science, and those enrolled in the fall of 1972 as new students, who transfer to Polytechnic for the academic year 1973-1974 will be granted full transfer credit for work completed at NYU. They will be able to earn a Bachelor's or Master's Degree in accordance with the curricula of either NYU or Polytechnic, and the transcript will indicate which of these two curricula has been completed. Similar transfer credit will be granted to doctoral candidates, including credit for preliminary examinations, qualifying examinations and foreign language examinations. Alternatively, undergraduate students currently registered at NYU who will complete their degree requirements prior to the end of the 1974-1975 academic year may elect to obtain NYU diplomas in accordance with the rules of the NYU faculty. In such cases, the disposition of the so-called "Bundy money" shall be in accordance with the decision of the State Education Department.

(b) Financial Assistance. Financial aid will be offered to students transferring to Polytechnic on

the same basis that it is offered to all other Polytechnic students. Polytechnic represents that its policy is to make every effort to provide sufficient financial aid to students in order that no qualified student be denied a Polytechnic education by reason of inability to pay.

7. Best Efforts

The parties recognize their obligation to respect the right to freedom of individual decision on the part of their faculties, nonacademic staffs, and students. The parties agree, however, that they will use their best efforts to persuade such faculties and students to co-operate in effecting the merger according to the terms of this Agreement.

8. Substantial Performance

Inasmuch as the learning, reputation and good-will of their respective faculties constitute the principal assets of the respective institutions, the parties agree that this Agreement shall be deemed to be in full force and effect upon the certification in writing by Polytechnic to NYU, on or before noon September 1, 1972, that Polytechnic is satisfied that its requirement is fulfilled, namely that it has received by the close of business on August 28, 1972 written acceptances of its offers of employment from faculty and staff members responsible for sponsored research and

training projects in force at NYU School of Engineering and Science having a total annual level of two and one-half million ($2,500,000) dollars; and upon the corresponding certification by NYU to Polytechnic, also on or before noon September 1, 1972, that NYU is satisfied that its requirement is fulfilled, namely that these written acceptances have been received no later than August 28, 1972 from at least fifty-three (53) members of the present voting faculty of NYU School of Engineering and Science as listed in Schedule A. Polytechnic shall advise NYU by telephone and shall provide NYU with a copy of each such acceptance promptly upon its receipt. If the conditions of substantial performance, as herein defined, are not fulfilled by noon September 1, 1972, this Agreement shall be null and void. In the event that this Agreement becomes null and void, the parties will nonetheless continue to consult each other as to compliance with Chapter 463 of the Laws of 1972 of the State of New York.

9. Undertakings by NYU

After the entry of this Agreement into full force and effect, on or about noon September 1, 1972, as provided in paragraph 8 above, NYU covenants and agrees as follows:

(a) Students. NYU will take immediate steps to inform its students who are registered in the NYU School of Engineering and Science about the relevant terms of this merger and will make available to Polytechnic a

complete list of the names and addresses of such students for such additional circularization as may be deemed advisable. Should any student of the NYU School of Engineering and Science deny permission for disclosure of his address, NYU will transmit to him such statements as may be provided by Polytechnic for that purpose. On determination that a student intends to complete his studies at Polytechnic, NYU will make available to Polytechnic a copy of the student's complete academic file. It is understood that the recruitment of NYU students by Polytechnic will be aimed to take effect in 1973.

(b) Alumni. Within a reasonable time thereafter, NYU will make available to Polytechnic the names and addresses of all alumni of the NYU School of Engineering and Science.

(c) Contracts and Grants. Annexed hereto as Exhibit C is a list of all research and training contracts and grants which are currently in force at NYU School of Engineering and Science, indicating the name of the principal investigator responsible for each such contract or grant and the dollar amount of the annual payments pursuant to each such contract or grant. With respect to each contract and grant with respect to which the responsible principal investigator has accepted Polytechnic's offer of

employment under the provisions of this Agreement, NYU agrees to assign and transfer to Polytechnic, by the appropriate instruments, all its right, title and interest in and to such contract or grant, together with any Federal, State or other sponsor's funds remaining allocable to such contract or grant, and any special equipment purchased from such funds, provided the consent of the appropriate sponsor to such assignment and transfer is duly obtained. NYU covenants to use its best efforts to secure such consent.

(d) Other Equipment. Certain items of personal property, e.g., specialized equipment, currently owned by NYU and used by NYU School of Engineering and Science which are not acquired by the City University Construction Fund under the provisions of Chapter 463 of the Laws of 1972 of the State of New York as part of its purchase of the Heights campus of NYU, and which are not of use to other schools or subdivisions of NYU (of which NYU shall be the sole judge), shall be transferred to Polytechnic (unless Polytechnic elects not to accept any such items of property), without cost, in order to facilitate continuation of the professional activities of faculty members of the NYU School of Engineering and Science transferring to Polytechnic. In addition, subject to the

provisions of Chapter 463, the parties agree to transfer at a fair price to Polytechnic other specialized equipment owned by NYU and used by members of the faculty of NYU School of Engineering and Science electing to transfer to Polytechnic that may be required for their teaching or research and which is not required for the remaining operations of NYU.

(e) Heights Campus. With respect to certain buildings, structures, fixtures, improvements and personal property currently used by the NYU School of Engineering and Science that are included in the properties that the City University Construction Fund is authorized by Chapter 463 of the Laws of 1972 of the State of New York to purchase from NYU for the sole use of the Bronx Community College, Polytechnic may at its option explore with City University of New York the feasibility of obtaining permanently or temporarily, by sale, lease or otherwise, the continued use of such facilities by Polytechnic for the purposes contemplated by this merger. If Polytechnic so requests, NYU agrees to use its best efforts to assist in this endeavor.

(f) Applications for Financial Assistance. In the event that Polytechnic prior to the Closing Date, as hereinafter provided, shall make application for financial assistance from public or private sources for the specific

purpose of facilitating the merger contemplated by this Agreement, NYU covenants and agrees upon Polytechnic's request to use its best efforts to assist Polytechnic in this endeavor.

10. Defeasance Clause

Notwithstanding the provisions of paragraph 8 (Substantial Performance) above, either party shall have the option to declare that this Agreement is null and void, and the faculty employment contracts entered into pursuant thereto, shall be voidable at the option of either the faculty member or Polytechnic, if the financial plan adopted by Polytechnic and submitted to the Regents of the State of New York on or before October 1, 1972, for the five-year period beginning with the 1972-73 academic year, does not meet with the approval of the Regents and the Governor as required by Chapter 463 of the Laws of 1972 of the State of New York. This provision shall become operative if the Regents and the Governor have not affirmatively expressed their approval of such plan prior to December 1, 1972. In that event, the party exercising its option shall notify the other within one week, and both parties shall forthwith be returned as far as possible to their respective positions as they would have been if this Agreement had never been executed or had never been deemed to be in full force and effect.

11. Miscellaneous Representations and Covenants

To aid in the carrying out of this Agreement, the parties make the following representations and covenants:

(a) Each party represents that it is an educational corporation, duly incorporated, validly existing and in good standing under the laws of the State of New York with full power and authority to own its properties and conduct its operations as now being conducted, and to enter into and perform the acts and agreements herein contemplated and made.

(b) The parties hereto agree to keep the State Education Department fully informed with respect to the terms and conditions of this Agreement, and any modifications thereof, and with respect to action taken pursuant thereto. The parties further agree to cooperate promptly and effectively with the State Education Department in the implementation of this Agreement.

(c) The parties hereto agree to execute and deliver all such other and additional documents and instruments as may be necessary or desirable in order to effectuate the provisions and purposes of this Agreement.

(d) The parties hereto agree that their obligations to each other are fully set forth herein and that the provisions hereof constitute the whole agreement

between the parties. No oral modifications or additions hereto shall be binding.

(e) NYU undertakes to review the legal status of endowment funds currently held by NYU and specifically designated for the support of the NYU School of Engineering and Science, and to determine whether all or any part of those restricted endowment funds may legally be retained by NYU for their original purposes, or for other purposes with the consent of donors or their representatives or of the Attorney General, and are likely to be used for such purposes within a reasonable time after the consummation of the merger contemplated by this Agreement. If NYU itself determines, upon the advice of counsel, that any part of those restricted endowments cannot legally be retained and properly used within a reasonable time by NYU, NYU will so advise Polytechnic and shall provide Polytechnic with an opinion of counsel to such effect; and the parties agree to discuss, prior to the Closing Date, the terms and conditions under which such funds might legally and properly be transferred to Polytechnic. It is understood that Polytechnic does not hereby acquire any rights to any NYU endowments.

(f) The parties agree that any term or condition of this Agreement included for the benefit of one party hereto may be waived by such party and that waiver of any term or condition by either party does not constitute a waiver of the entire Agreement.

12. Mutual Indemnities

(a) Except as may be required by the government agencies or other sponsors of the research contracts and grants assigned pursuant to Paragraph 9(c), Polytechnic does not assume any contracts, commitments or liabilities, contingent or otherwise, of NYU, it being understood that the transactions contemplated by this Agreement, although referred to as a "merger," consist principally of a transfer of faculty and the assignment of research and training contracts and grants. Without limiting the generality of the foregoing, Polytechnic assumes no liability for payment of salaries, retirement contributions or other obligations to any present or former faculty member of NYU arising prior to (or with respect to a period prior to) the date of the commencement of his employment by Polytechnic.

(b) Polytechnic hereby indemnifies and will hold harmless NYU (and each Trustee or other officer of NYU) from and against any and all losses, claims, damages or liabilities to which NYU (or such Trustee or other officer) may become subject (including any legal or other expenses reasonably incurred in connection therewith) insofar as such losses, claims, damages or liabilities arise

out of or are based upon (i) any nonperformance by Polytechnic of its contractual obligations to faculty members transferred to Polytechnic, under new contracts made with Polytechnic, (ii) any operations of Polytechnic subsequent to the Closing referred to in paragraph 13, or (iii) the claims of present or former faculty members, students or employees of Polytechnic based on the transfer contemplated by this Agreement.

(c) NYU hereby indemnifies and will hold harmless Polytechnic (and each Trustee or other officer of Polytechnic) from and against any and all losses, claims, damages or liabilities to which Polytechnic (or such Trustee or other officer) may become subject (including any legal or other expenses reasonably incurred in connection therewith) insofar as such losses, claims, damages or liabilities arise out of or are based upon (i) the operation of NYU's School of Engineering and Science prior to the Closing referred to in paragraph 13, including, without limiting the generality of the foregoing, the matters referred to in subparagraph (a) of this paragraph 12 as not being assumed by Polytechnic, (ii) the transfer contemplated by this Agreement, except as provided in paragraph (b)(iii) above, or (iii) the failure of Polytechnic to make an offer to

any person listed on Schedule A who is not listed on Schedule B attached hereto.

(d) Upon the presentation in writing of any claim or the commencement of any suit against any defendant in respect of which indemnity may be sought by virtue of paragraphs (b) or (c) above, such defendant shall with reasonable promptness give notice in writing of such claim or suit to the indemnifying party. The indemnifying party shall be entitled to participate at its own expense in the defense, or, if it so elects, to assume the defense of any such claim or suit, but if the indemnifying party elects to assume the defense, such defense shall be conducted by counsel chosen by the indemnifying party and satisfactory to the defendants who are parties to such suit or against whom such claim is presented.

13. Closing

Consummation of this merger shall take place no later than June 30, 1973, or at such earlier date as the parties hereto may mutually agree upon in writing, at 11:00 o'clock in the morning at the offices of Royall, Koegel & Wells, Esqs., 200 Park Avenue, New York, New York, which consummation is the "Closing" and which date is the "Closing Date."

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be entered into and signed by their respective corporate officers as of the day and year hereinabove first set forth.

NEW YORK UNIVERSITY

By _____
President

POLYTECHNIC INSTITUTE OF BROOKLYN

By _____
President

SCHEDULE A

FACULTY MEMBERS OF NEW YORK UNIVERSITY SCHOOL OF ENGINEERING AND SCIENCE

July 26, 1972

DEPARTMENT	RANK	TENURE STATUS
Aero & Astro		
Lee Arnold	P	T
Antonio Ferri	P	T
Arnold D. Kerr	P	T
Simon Slutsky	P	T
Gordon Strom	P	T
Roberto Vaglio-Laurin	P	T
Victor Zakkay	P	T
Huie huang Chiu	AP	T
Morris Isom	AP	T
Jack Werner	AP	T
Gabriel Miller	aP	U
Michael Rudd	RaP	U
Chemical		
John Happel	P	T
Robert Parker	P	T
Robert Treybal	P	T
Walter Brenner	AP	T
William Kapfer	AP	T
Reiji Mezaki	AP	T
Yoshiyuki Okamoto	RAP	U
Henry Schwartzberg	AP	T
Leonard Wikstrom	AP	T
Miguel Hnatow	aP	U
Civil		
Charles Birnstiel	P	T
Alvin Goodman	P	T
James Michalos	P	T
Edward Wilson	P	T

DEPARTMENT	RANK	TENURE STATUS
Civil - cont'd		
Eric Gidlund	AP	T
Albert H. Griswold	AP	T
Bernard Grossfield	AP	T
Morris Grosswirth	AP	T
Gerald Kubo	AP	T
Mo C. Li	AP	T
Alan Molof	AP	T
Nichalos Morris	AP	T
Raul Cardenas	aP	U
Electrical		
Herbert Freeman	P	T
Mohammed Ghausi	P	T
Philip Greenstein	P	T
Ludwik Kurz	P	T
Bernard Ley	P	T
Frank Lupo	P	T
Nathan Marcuvitz	P	T
Istvan Palocz	P	T
John R. Ragazzini	P	T
Charles Rehberg	P	T
Philip Sarachik	P	T
Sidney Shamis	P	T
Bernard Cheo	AP	T
Douglas Davids	AP	T
Anthony Grammaticos	AP	U
Richard Harrison	AP	U
John Kelly	AP	U
John Metzner	AP	T
* Alvy Ray Smith	AP	U
Irwin Yagoda	AP	U
Robin Williams	aP	U
Industrial		
Norman Barish	P	T
Saul Blumenthal	P	T
John T. Chu	P	T
Sylvain Ehrenfeld	P	T
Leon Herbach	P	T

DEPARTMENT	RANK	TENURE STATUS
Industrial - cont'd		
John H. Kao	P	T
* Seymour Kaplan	P	T
Melvin Klerer	P	T
Mark Mayzner	P	T
Robert Roeloffs	P	T
John Andreassi	AP	U
Satya Dubey	AP	U
Irwin Greenberg	AP	T
Ravinder Nanda	AP	T
Lois Graff	aP	U
Prasadarao Kakumanu	aP	U
Anastasios Stamboulis	aP	U
Mechanical		
Austin Church	P	T
Lewis Johnson	P	T
Fred Landis	P	T
Wheeler K. Mueller	P	T
H.H. Pan	P	T
Emanuel A. Salma	P	T
Bernard Shaffer	P	T
Ferdinand Singer	P	T
Thomas Bechert	AP	U
* Shih H. Chan	AP	U
Michael Chen	AP	U
Richard Thorsen	AP	T
Barry Wolf	AP	T
Richard Thaler	aP	U
Metallurgy		
Irving Cadoff	P	T
Harold Margolin	P	T
John Nielsen	P	T
Ernest Levine	AP	U

DEPARTMENT	RANK	TENURE STATUS
Meteor. & Ocean.		
* James Friend	P	T
James Miller	P	T
Gerhard Neumann	P	T
Katsuyuki Ooyama	P	T
Willard Pierson	P	T
Richard Schotland	P	T
Jerome Spar	P	T
Raymond Deland	RAP	U
Albert Kirwan	AP	T
Vincent Cardone	RAP	U
Eric Posmentier	aP	U
Nuclear		
Raphael Aronson	P	T
John Lamarsh	P	T
Harold McFarlane	aP	U

*Promoted as of September 1, 1972

SCHEDULE B

FACULTY MEMBERS OF NEW YORK UNIVERSITY
SCHOOL OF ENGINEERING AND SCIENCE
TO WHOM POLYTECHNIC INSTITUTE OF BROOKLYN IS OBLIGATED
TO MAKE OFFERS OF APPOINTMENT PURSUANT TO PARAGRAPH 4.

July 26, 1972

DEPARTMENT	RANK	TENURE STATUS
Aero & Astro		
Lee Arnold	P	T
Antonio Ferri	P	T
Arnold D. Kerr	P	T
Simon Slutsky	P	T
Gordon Strom	P	T
Roberto Vaglio-Laurin	P	T
Victor Zakkay	P	T
Huie huang Chiu	AP	T
Morris Isom	AP	T
Jack Werner	AP	T
Gabriel Miller	aP	U
Chemical		
Robert Parker	P	T
Robert Treybal	P	T
Walter Brenner	AP	T
William Kapfer	AP	T
Reiji Mezaki	AP	T
Henry Schwartzberg	AP	T
Leonard Wikstrom	AP	T
Miguel Hnatow	aP	U
Civil		
Charles Birnstiel	P	T
Alvin Goodman	P	T
James Michalos	P	T
Edward Wilson	P	T
Eric Gidlund	AP	T
Albert H. Griswold	AP	T
Bernard Grossfield	AP	T
Morris Grosswirth	AP	T
Gerald Kubo	AP	T

DEPARTMENT	RANK	TENURE STATUS
Civil - cont'd		
Alan Molof	AP	T
Nichalos Morris	AP	T
Raul Cardenas	aP	U
Electrical		
Herbert Freeman	P	T
Mohammed Ghausi	P	T
Ludwik Kurz	P	T
Bernard Ley	P	T
Frank Lupo	P	T
Nathan Marcuvitz	P	T
Istvan Palocz	P	T
John R. Ragazzini	P	T
Charles Rehberg	P	T
Philip Sarachik	P	T
Sidney Shamis	P	T
Bernard Cheo	AP	T
Douglas Davids	AP	T
Anthony Grammaticos	AP	U
Richard Harrison	AP	U
John Kelly	AP	U
John Metzner	AP	T
*Alvy Ray Smith	AP	U
Robin Williams	aP	U
Industrial		
Norman Barish	P	T
Saul Blumenthal	P	T
John T. Chu	P	T
Sylvain Ehrenfeld	P	T
Leon Herbach	P	T
John H. Kao	P	T
*Seymour Kaplan	P	T
Melvin Klerer	P	T
Mark Mayzner	P	T
Robert Roeloffs	P	T
John Andreassi	AP	U
Irwin Greenberg	AP	T
Ravinder Nanda	AP	T
Lois Graff	aP	U
Prasadarao Kakumanu	aP	U
Anastasios Stamboulis	aP	U

DEPARTMENT	RANK	TENURE STATUS
Mechanical		
Lewis Johnson	P	T
Fred Landis	P	T
Wheeler K. Mueller	P	T
H. H. Pan	P	T
Bernard Shaffer	P	T
Thomas Bechert	AP	U
*Shih H. Chan	AP	U
Michael Chen	AP	U
Richard Thorsen	AP	T
Barry Wolf	AP	T
Richard Thaler	aP	U
Metallurgy		
Irving Cadoff	P	T
Harold Margolin	P	T
John Nielsen	P	T
Ernest Levine	AP	U
Meteor. & Ocean.		
*James Friend	P	T
James Miller	P	T
Gerhard Neumann	P	T
Katsuyuki Ooyama	P	T
Willard Pierson	P	T
Richard Schotland	P	T
Jerome Spar	P	T
Eric Posmentier	aP	U
Nuclear		
Raphael Aronson	P	T
John Lamarsh	P	T
Harold McFarlane	aP	U

*Promoted as of September 1, 1972

SCHEDULE C

Annual level of support for contracts and grants terminating after 8/1/72, and those grants which have terminated before 8/1/72 for which there is verbal assurance from the sponsor that there will be a renewal

NYU Account No.	Principal Investigator	Yearly Volume	
Aerospace			
0-5511-515	A. Ferri	$ 40,000	
0-5511-524	L. Bennett	20,000	
0-5511-626	M. Isom	20,474	
0-5511-663	V. Zakkay	87,792	
0-5511-664	A. Ferri - V. Zakkay	97,735	
0-5511-667	A. Kerr	35,721	
0-5513-116	A. Ferri	65,000	
0-5513-154	A. Ferri	100,000	
0-5513-355	A. Ferri	10,000	
0-5513-511	A. Kerr	18,342	
0-5513-611	V. Zakkay	50,005	
0-5513-628	L. Bennett	34,704	
0-5513-631	A. Kerr	20,293	
0-5513-634	A. Ferri	25,000	
0-5513-636	V. Zakkay	15,000	
0-5513-652	R. Vaglio-Laurin	86,725	
0-5513-655	A. Ferri-Werner	40,000	
0-5513-659	L. Arnold-Slutsky	76,700	
0-5513-672	A. Ferri-Hoydysh	65,000	
0-5515-641	W. Hoydysh	9,600	
0-5515-644	S. Slutsky	7,500	
0-5515-621	V. Zakkay	22,734	
	Total - Aerospace		948,325
Chemistry			
0-5511-766	W. Brenner	27,875	
0-5513-512	J. Happel	22,750	
0-5513-605	J. Happel	3,500	
0-5513-633	R. Treybal	17,000	
0-5513-673	J. Happel	43,462	
0-5514-646	W. Brenner	18,750	
0-5515-422	W. Brenner	40,000	
0-5515-627	M. Kronstein	5,000	
0-5515-656	M. Kronstein	5,000	
	Total - Chemistry		183,337

NYU Account No.	Principal Investigator	Yearly Volume	
Electrical Engineering			
0-5511-362	H. Freeman	30,000	
0-5511-502	N. Marcuvitz	43,000	
0-5511-665	J. Yagoda	28,000	
0-5513-385	H. Freeman	49,976	
0-5513-624	B. Chao	40,388	
0-5518-326	H. Freeman	16,666	
	Total - Elec. Eng.		208,030
Industrial Engineering			
0-5511-356	M. Mayzner	46,867	
0-5511-520	S. Dubey	22,760	
0-5511-597	J. Kao	16,000	
0-5513-395	S. Ehrenfeld	21,266	
0-5513-476	M. Mayzner	22,500	
0-5513-523	M. Klerer	68,850	
0-5513-629	L. Herbach	33,450	
	Total - Ind. Eng.		231,693
Mechanical Engineering			
0-5513-535	B. Shaffer	18,500	
0-5513-541	S. Chan	29,050	
0-5513-619	M. Chen	29,100	
0-5518-618	F. Landis	32,890	
0-5518-376	F. Landis	16,000	
	Total - Mech. Eng.		125,540
Metallurgy			
0-5511-630	H. Margolin	26,000	
0-5511-654	H. Margolin	49,948	
0-5513-521	H. Margolin	30,458	
	Total - Metallurgy		106,406
Meteorology and Oceanography			
0-5511-451	W. Pierson	40,000	
0-5511-513	W. Pierson	193,340	
0-5511-602	R. Schotland	77.034	
0-5511-616	R. Schotland	49,976	
0-5513-245	J. Miller	70,000	
0-5513-438	E. Posmentier	17,127	
0-5513-446	J. Miller	2,188	
0-5513-475	J. Friend	39,040	
0-5513-500	R. Deland	22,000	
0-5513-563	W. Pierson	9,200	

Meteorology and Oceanography (continued)

NYU Account No.	Principal Investigator	Yearly Volume	
0-5513-614	H. Frey	11,250	
0-5513-615	R. Leifer, J. Friend	49,900	
0-5513-620	J. Spar	42,000	
0-5513-666	W. Pierson	70,000	
0-5515-408	J. Halitsky, E. Kaplan	41,374	
0-5515-677	E. Kaplan	67,832	
0-5515-547	J. Halitsky, E. Kaplan	19,435	
0-5515-625	W. Pierson	65,193	
0-5518-678	J. Friend	153,429	
	Total - M & O		1,040,318
Nuclear			
0-5511-365	R. Aronson	18,703	
General			
0-5511-072	D. Goodman	250,000	
	TOTAL		$3,112,352

APPENDIX A (continued)

MERGER AGREEMENT

BETWEEN

NYU/SES AND PIB

MARCH 21, 1973

AGREEMENT OF MERGER OF PROGRAMS AND FACULTY

made and entered into this day of March, 1973 by and between New York University ("NYU"), an educational corporation of the State of New York, having its principal office at 40 Washington Square South, New York, New York, the Faculty of NYU School of Engineering and Science ("NYU/SES"), Polytechnic Institute of Brooklyn ("PIB"), having its principal office at 333 Jay Street, Brooklyn, New York, an educational corporation of the State of New York, and the Faculty of PIB.

W I T N E S S E T H :

We, the Polytechnic Corporation of Brooklyn and the Board of Trustees of NYU (hereinafter collectively and individually referred to as the "Board of Trustees"), the Administration of PIB, the Faculty of PIB, the Administration of NYU, and the Faculty of NYU/SES, in order to achieve the objectives expressed by the Legislature of New York State in Chapter 463 of the Laws of 1972 (the "statute") and in the spirit of the letter by The Commissioner of Education, Ewald B. Nyquist, dated November 20, 1972, which we have all signed, agree to the merger of the appropriate educational and research programs and Faculty of NYU/SES as provided

herein with PIB in order to establish a major new technological institution ("MI") dedicated to excellence in scholarship and the education of students, and to the solution of societal problems through research; an institution which, although based on the existing corporate structure of PIB, will have a new name, an active and representative Board of Trustees, and an affiliation with NYU for the mutual benefit of the two institutions.

We conceive of a new institution whose faculty members are encouraged to assess existing programs and promulgate new academic and research programs, especially of an interdisciplinary nature; to devise innovative and imaginative approaches to the education process; and to seek and expand support for research from all sources -- an institution which recognizes the importance of a sound balance between tenure and non-tenure appointments, compensates the faculty at the highest levels consistent with responsible fiscal management, and rewards its faculty and staff on the basis of demonstrated performance.

ARTICLE I

Section 1. Objectives

The parties hereto agree that as required by statute, on the Closing Date hereafter specified there shall be merged into PIB, to form MI, the educational and research programs and faculty of the NYU School of Engineering and Science as hereinafter provided; and PIB agrees to accept such educational and research programs and faculty and devote the same to its corporate purposes and to the objectives of this Agreement.

Section 2. Name

A new name shall be selected for MI.

ARTICLE II

GOVERNANCE

Section 1. Objectives

The governance of MI shall seek to satisfy the following needs:

(a) To foster the growth of MI into a technological university of the first rank.

(b) To protect the legitimate interests of all parties directly concerned: in particular, the fair treatment of both prior faculties and student bodies.

(c) To expedite decisions that must be made promptly concerning the academic programs of MI in 1973-74.

(d) To reaffirm faculty responsibility for educational policies.

(e) To insure proper and adequate faculty inputs to the processes by which the president and academic administrators are selected.

Section 2. Board of Trustees

The following steps shall be taken to achieve a meaningful reconstitution of the MI Board of Trustees:

(a) The number of trustees shall not exceed twenty-five (25), divided into three (3)

substantially equal classes, having staggered three-year terms of office.

(b) The chairman of the Board of Trustees will make best efforts to obtain resignations of inactive members. The nominating committee of the Board of Trustees will seek to fill the vacancies thus created and those already existing in a fashion consistent with the merger. The Board of Trustees will seek recommendations for nominations for membership from all parties to the merger and will actively consider all such nominations.

* (c) One or two positions in each class of Board members shall be reserved for nominations by the faculty, subject to approval and election by the Board. During the first year of the merger agreement, the faculty will nominate three or six persons (one or two in each class) to serve terms of either one, two or three years respectively. The faculty will nominate successors to complete the terms of of office of any of its nominees to the Board who for any reason do not serve to the expiration of their terms. The faculty of MI will not nominate any of its own members.

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*Disagreement on the numbers to be nominated. Item goes to the Commissioner of Education for binding arbitration.

(d) The Board of Trustees will restructure its Executive Committee as necessary to best implement the mission and broader base of the merged institution. Full consideration will be given to the new members of the Board in the formation of the Executive Committee.

(e) Faculty members will be appointed by the Board of Trustees upon nomination by the Faculty Senate to serve on those standing and ad hoc committees of the Board that are primarily concerned with educational policies and planning.

Section 3. Academic and Administrative Structures

Provisions shall be made for a reconstitution of the academic and administrative structures at MI and for a complete and continuing re-examination of the academic, fiscal, administrative and other needs and aims of the institution. All academic administrators shall submit their resignations as of September 1, 1973. Acting academic administrators shall be appointed by the President of MI and shall serve thereafter until confirmed or replaced. All administrators of MI, other than the President, shall serve in their administrative capacity at the pleasure of the

President, subject to the approval of the Board of Trustees. Effective July 1, 1974, all administrative personnel not having academic rank and/or faculty status shall normally have employment contracts of one year.

Section 4. Faculty Advisory Committees

(a) The acting or the permanent president shall be assisted by a faculty advisory committee consisting of four members, two from each of the two prior (NYU/SES and PIB) faculties. Members of this committee shall be elected by and report to the Executive Committee of the Faculty Senate. This committee shall terminate on June 30, 1974.

(b) Search committees will be constituted for all academic administrative positions at the level of department head and above. Equitable and adequate representation of the prior PIB and NYU/SES faculties shall prevail in such search committees and must be certified by the faculty advisory committee mentioned in 4(a) above. The President shall have final authority in the making of appointments recommended by the search committees.

Section 5. Faculty Governance

(a) The faculty of MI shall elect the chairman-elect of the Faculty Senate by November 1, 1973.

(b) The NYU/SES Faculty shall elect, by May 14, 1973, four of its members to serve as additional members of the Executive Committee of the Faculty Senate of the MI, one for a term of three years, one for a term of two years, and two for terms of one year. The additional members of the Executive Committee of the Senate of the MI will have phased out by August 31, 1976 and the Executive Committee will then consist of the Chairman, Chairman-Elect, Secretary of the Faculty, and six elected members of the Senate in accord with the present By-Laws of the Senate.

(c) For the period from the date the merger agreement is signed until August 31, 1973 the NYU/SES faculty shall appoint coordinating faculty members to work with the following committees of the PIB Faculty Senate:

(1) Admissions Committee
(2) Educational Policies Committee
(3) Graduate Curriculum and Standards Committee
(4) Library Committee
(5) Research Policies Committee
(6) Student Affairs Committee
(7) Undergraduate Curriculum and Standards Committee

Section 6. Charter and By-Laws

(a) The trustees shall immediately petition the Regents for amendment of the Charter of the Corporation to authorize the offering of undergraduate study in Engineering and Science in Nassau and Suffolk Counties, and to grant the authority to award appropriate degrees.

(b) The trustees shall also immediately petition the Regents for amendment of the Charter of the Corporation to authorize the offering of graduate and undergraduate programs in Engineering and Science, and related disciplines, in the five counties of New York City and in Westchester County, and to grant the authority to award appropriate degrees.

(c) The By-Laws of the Corporation and the Faculty Senate will be amended, if necessary, to authorize the implementation of the reccmmendations contained in this merger agreement

ARTICLE III

STUDENTS

Section 1. With respect to students who transfer from NYU/SES to MI, the parties agree as follows:

(a) Degrees. All students currently registered or enrolled at NYU/SES may transfer to MI and will be granted full transfer credits for work completed at NYU. For graduate students this shall include credit for preliminary examinations, qualifying examinations, foreign language examinations, special projects credits, etc.

Transfer students will be able to earn appropriate degrees in accordance with the programs of either NYU or MI and the transcript will indicate which of these two programs has been completed. Prior to August 31, 1973, the NYU/SES faculty, with the approval of the NYU Board of Trustees, will establish an appropriate academic mechanism to amend its degree and program rules, if necessary, to assure the granting of NYU degrees,within the time limits specified below, to NYU/SES students who transfer to MI.

Programs now in effect at NYU/SES will be continued and/or arranged by MI in order to permit the graduation of students currently enrolled in NYU/SES within the time limits specified below.

The MI will make application to the State Education Department to register at MI all degrees now awarded by NYU/SES which are not awarded by PIB, and in the interim NYU/SES transfer students at MI may be awarded all appropriate degrees currently offered by NYU/SES.

Day division undergraduate and master's degree students currently registered at NYU/SES who will complete their degree requirements prior to the end of the 1975-76 academic year and evening division undergraduate, engineer's degree and doctoral students who complete their degree requirements prior to the end of the 1977-78 academic year, may elect to obtain NYU diplomas in accordance with the rules of the NYU faculty. In such cases, the disposition of the so-called "Bundy money" shall be in accordance with the decision of the State Education Department.

(b) Financial Assistance. Financial aid will be offered at MI to NYU/SES students transferring to MI on the same basis that it is offered to all currently enrolled PIB students. MI policy will be to make every effort to provide sufficient financial aid to students in order that no qualified student be denied a MI education by reason of inability to pay.

During the transitional year 1973-74 NYU and MI will jointly provide financial aid to specific NYU/SES

students who transfer to MI in an amount equivalent to that received by such individuals in 1972-73 in the following manner:

(1) MI will provide tuition remission to such students in an amount equivalent to that provided by NYU in 1972-73 taking into account the differential in tuition rates at the two institutions;

(2) NYU will provide direct cash awards, not to exceed the amount received by each individual in 1972-73, to all undergraduate students who, in 1972-73, received cash awards from funded sources only and who would be eligible for continuation of such awards in 1973-74 if they had remained enrolled at NYU/SES, and to not more than 28 graduate students including graduate teaching assistants and teaching fellows currently in NYU/SES who would normally have been continued in 1973-74 based on the recommendation of their NYU/SES department chairmen; and

(3) NYU will provide direct cash loans, from funded sources only, in the same amounts and under the same terms and conditions that would have been available to such eligible students if they had remained enrolled at NYU/SES, provided that MI undertakes the same steps that NYU would have taken to ensure repayment in due course to NYU.

(4) Special consideration shall be given to staff members of NYU/SES whose employment is not continued at MI and who are currently enrolled in an engineering program under NYU tuition remission to permit the continuance of their studies at MI without financial hardship.

Section 2. With respect to students currently enrolled at PIB, the parties agree as follows:

(a) In the event of a name change, the students currently registered at PIB shall have the option of having the transcript clearly indicate courses taken at PIB and courses taken at MI.

(b) In the event of a name change, the possibility of adding the name of PIB to MI diplomas shall be explored for the benefit of those students currently registered at PIB.

ARTICLE IV

PERSONNEL

Section 1. Objectives The parties seek the achievement of the following goals for MI:

(a) The maintenance of a healthy balance between tenured and non-tenured faculty members.

(b) The maintenance of appropriate levels of academic staff in all program areas.

(c) The authorization of additions and replacements in those programs where they are merited.

(d) The evaluation, by a panel of experts, of all academic programs on a regular basis and the making of recommendations pertaining to their future directions.

(e) Proper recognition and due rewards for the faculty who enhance the reputation of MI.

Section 2. Conditions of Appointment for NYU/SES Faculty

(a) Offer of Appointment. Within ten (10) days after the approval of the merger agreement PIB will mail a written offer of appointment effective September 1, 1973 to every individual who held a primary appointment as a bona fide member of the faculty of NYU/SES as of December 1, 1972 except (i) those who have resigned from NYU/SES or who have accepted employment elsewhere, (ii) those who have been

advised, based on academic evaluation, that they would not be reappointed at NYU/SES, and (iii) those who will have reached the age of 65 years prior to September 1, 1973.

Nothing in the above shall preclude offers of employment to faculty members contained in item (iii) above. A list of eligible faculty members is annexed hereto as Appendix A.

Each offer shall be deemed independent of acceptance or rejection by other faculty members. Such offers shall be made by certified mail and shall be open for fourteen (14) days following the day of mailing, except for individuals listed as special cases in Appendix A who will be granted an appropriate extension.

(b) Tenured Faculty. All faculty members at NYU/SES who have achieved tenure or have been notified that they would have achieved tenure by September 1, 1973 will be offered appointments with tenure.

(c) Non-Tenured Faculty. All non-tenured NYU/SES faculty members, with the exception of research professors as identified in item (d), will be offered appointments for a period of at least two years.

(d) Research Professors. Research professors in the various professorial ranks at NYU/SES will receive offers of one year appointments at their present ranks. It is understood that MI may reexamine the titles of research professors

during the coming year.

(e) Security Rights. For purposes of determining security rights and privileges, seniority, sabbatical leaves, retirement age and promotions, the prior service of the NYU/SES faculty shall be considered as having been earned at PIB.

Section 3. Provisions Relating to NYU/SES and PIB Faculties

(a) Fair and Equal Treatment. To assure equitable treatment of both prior faculties in the granting of reappointment, tenure, promotion, teaching loads, the scheduling of work load, and merit increases, the administration and faculty will establish appropriate ad hoc procedures for review, when necessary. After the end of the first two full academic years, the procedures generally provided for the faculty will constitute compliance with this requirement.

(b) Professional Development. The customary rights of faculty members to engage in activities relating to professional development shall be respected.

(c) Retirement Age. The faculty retirement policy currently in existence at PIB will be continued by MI.

(d) Reassignment Salaries of Administrators. Administrators currently at PIB or NYU/SES who are on appointments extending beyond the normal academic year may be offered nine months' appointments at adequate and equitable salaries.

(e) Teaching Assignments. When the overall interests of the merged institution so require, faculty members who have the requisite background and/or experience may be asked to participate in teaching for other departments. The individuals' rights and the judgment of the department heads affected shall be respected.

(f) Fringe Benefits. The following fringe benefits shall apply at MI effective September 1, 1973:

(1) TIAA/CREF Contributions. The MI contribution to TIAA/CREF shall equal 10% of the basic annual salary less $120.00. The individual contribution to TIAA/CREF shall be 5% of the basic annual salary less $120.00 unless a higher personal contribution is requested by the individual. The present TIAA/CREF eligibility rules of MI shall remain in effect.

(2) Major Medical Insurance. MI shall pay the premiums for a major medical insurance providing for at least 80% of approved medical expenses above the exclusion limits for participants and their dependents. Such exclusion limits shall not exceed $100 for participants covered by a basic Blue Cross/Blue Shield plan and $500 for participants not covered by a base plan. The total amount of insurance coverage shall be at least $50,000 per participant.

(3) Life Insurance. Each member of the bargaining unit may elect to subscribe to life insurance according to the plan currently in effect at PIB.

(4) Disability Insurance. Each member of the bargaining unit may elect to subscribe to disability insurance which is equivalent to that currently offered by NYU to its faculty. The annual premium contribution by the individual shall not exceed 0.2145% of his base salary with the remaining costs borne by MI.

(g) Faculty Salaries.

(1) The initial salary of a former NYU/SES faculty member at MI shall be specified in his letter of appointment. The salaries of PIB faculty members at MI shall be as specified in the letter of agreement between the AAUP and the PIB administration dated August 3, 1972.

(2) On or before February 1, 1974 the PIB administration and the AAUP shall reopen negotiations for an additional economic package and salaries for members of the bargaining unit to be effective retroactively to September 1, 1973.

The distribution of salary monies assigned to the bargaining unit shall be carried out on the following basis:

(i) Sums allotted to the professional (non-faculty) librarians shall be at the same ratio to the total sum as the ratio of the professional librarian payroll to the total payroll of members of the bargaining unit as of the date of the revised agreement resulting from these negotiations.

(ii) The remaining funds not covered under (i) shall be allocated to the prior PIB and NYU/SES faculty members in the same proportion as the number of former PIB faculty members bears to that of the former NYU/SES faculty members as of the date of the revised agreement resulting from these negotiations.

(iii) Both the amount of funds and their allocation (within the restrictions set forth above) shall be subject to negotiation. It is intended that at least one-third of the funds so set aside shall be devoted to merit increases and be applied pursuant to procedures to be negotiated between the parties.

If prior to March 1, 1974 the parties have not reached agreement, either party may submit the controversy to binding arbitration pursuant to the rules

of the American Arbitration Association. Any and all controversies and disputes arising hereunder shall be resolved through such arbitration. The parties shall not be limited in the presentation of their evidence but shall be permitted to adduce all evidence relevant to the question of appropriate salary adjustments including, but not limited to, the obligations of MI or PIB to their faculties and others and to the anticipated income and expenses contemplated in arriving at the agreement of merger between PIB and NYU. Either party may request of the arbitrator the right to take depositions and to have examinations before the hearing in arbitration. The scope of such depositions and examinations shall be for the arbitrator to determine.

(h) Terminal Leaves

There will be offered to each tenured member of the faculty of PIB and NYU/SES the opportunity to file an application for terminal leave with PIB. Such terminal leave will provide for one academic year's salary, together with the appropriate fringe benefits. The President of PIB acting with the advice of members of the NYU/SES and PIB faculties will promptly grant or deny the application and will notify the applicant.

Such notification will be delivered to the faculty member at least ten (10) days before the expiration of PIB's offer of appointment to the NYU/SES faculty member.

The payment of salaries to those faculty members who elect and are granted terminal leave shall be made monthly and the monthly payment will consist of 1/9th of his academic year salary, but shall terminate before the expiration of the full term of his terminal leave if the faculty member accepts and commences full-time employment elsewhere. In that event, the payments shall continue for 3 months following the month such employment commences, but not extending beyond the expiration of the terminal leave year.

Section 4. Employment of NYU/SES Academic Support Staff Present permanent secretarial, clerical and technical NYU employees working in connection with NYU/SES may receive offers of employment by MI or PIB. If such an employee accepts such employment, the employee shall, upon joining Local 153 of the Office & Professional Employees International Union, AFL-CIO, be entitled to the same seniority rights at MI or PIB as the employee would have had if all of the employee's employment at NYU had been at MI or PIB.

Section 5. Condition of Employment for NYU/SES Research Staff All professional, technical and clerical personnel specifically employed on and fully supported by externally sponsored research associated with NYU/SES shall be continued in MI subject to the continued availability of applicable externally provided funds in MI and subject to a certification that their continued service is needed. Professional personnel included in the above with the ranks of Senior Research Scientist, Research Scientist, Associate Research Scientist, or Assistant Research Scientist shall be continued in these or equivalent positions.

Section 6. PIB Faculty and Staff

(a) The MI shall assume all existing obligations of PIB to its faculty and staff.

(b) Upon positive recommendation of their respective departments and of the Tenure Committee, any faculty member whose current appointment ends between September 1973 and September 1974 will be reappointed for a period of one year, without regard to any other consideration.

Section 7. Collective Bargaining

(a) Nothing in this agreement is intended to infringe upon the legal rights and obligations of the AAUP at PIB as the sole and exclusive collective bargaining agent for the faculty, instructors and professional librarians, pursuant to the formal certification of the New York State Labor Relations Board.

(b) Nothing in this agreement is intended to infringe upon the legal rights and obligations of Office & Professional Employees International Union, Local 153, AFL-CIO at PIB as the sole exclusive bargaining agent for all non-academic employees as stipulated in the current contract.

ARTICLE V

PROGRAM AND RESEARCH LOCATIONS

Teaching and research shall take place at such locations outside of the primary Brooklyn location that will enhance the over-all educational program and attractiveness of the institution to students and faculty and will increase the ability to perform research. The Farmingdale Campus, Washington Square, The Harlem River Complex and the Bronx or Westchester shall all be considered.

Program locations will be considered on their merit and the final determination will take into account but not be limited to criteria relating to student recruitment and retention, potential growth of program, facilities, availability of faculty and finances.

ARTICLE VI

UNDERTAKINGS BY NYU

NYU agrees as follows:

(a) Students. NYU will take immediate steps to inform its students who are registered in the NYU/SES about the relevant terms of this merger and will make available to MI a complete list of names and addresses of such students for such additional circularization as may be deemed advisable. Should any student of the NYU/SES deny permission for disclosure of his address, NYU will transmit to him such statements as may be provided by MI for that purpose. On determination that a student intends to complete his studies at MI, NYU will make available to MI a copy of the student's complete academic file.

(b) Alumni. NYU will take immediate steps to make available to MI with the consent of the persons involved the names and addresses of all alumni of the NYU/SES.

(c) Contracts and Grants. In the case of research and training contracts and grants, with respect to which the responsible defacto principal investigator transfers from NYU/SES to MI, NYU agrees to assign and transfer to MI, by the appropriate instruments, all its right, title and interest in and to such contract or grant, together with any Federal,

State or other sponsor funds remaining allocable to such contract or grant, and any special equipment purchased from such funds, provided the consent of the appropriate sponsor to such assignment and transfer is duly obtained. NYU covenants to use its best efforts to secure such consent.

(d) Equipment. Certain items of specialized equipment, currently owned by NYU and used by NYU/SES which are not acquired by the City University Construction Fund under the provisions of Chapter 463 of the Laws of 1972 of the State of New York as part of its purchase of the Heights campus of NYU, and which NYU has not designated for use elsewhere in NYU, shall be transferred in trust to MI free of charge (unless MI elects not to accept any such items of property), without cost to NYU, in order to facilitate continuation of the professional activities of faculty members of the NYU/SES transferring to MI.

(e) Library. NYU agrees to grant to MI faculty and students access, under reasonable regulations, to the books, journals, reports, and other documents of the engineering collection of the NYU library system. It is contemplated by the parties that NYU will maintain the present collection on a reasonably current basis for a period of at lease five years, and will transfer duplicate items of the collection to MI without cost. In the event that NYU

should decide to dispose of all or any portion of said collection during this five-year period, MI will have the right of first refusal on the items to be disposed of.

ARTICLE VII

AFFILIATION WITH NEW YORK UNIVERSITY

In order to enhance the academic and research capabilities of both institutions, MI and NYU agree to negotiate an agreement of affiliation which is intended to provide mutual benefits to the students and faculties of both NYU and MI. Included in the items to be covered in this affiliation agreement are the following, although it is understood that the agreement should not necessarily be limited to them:

(a) Allowance for cross-registration by students.

(b) Mutual benefits for faculties of both institutions, including the possibility of joint appointments.

(c) Possible joint use of facilities, including libraries, computer services, student facilities, etc.

(d) The exploration of joint degree programs involving MI and the various schools of NYU.

ARTICLE VIII

MISCELLANEOUS REPRESENTATIONS AND COVENANTS

To aid in the carrying out of this Agreement, the parties make the following representations and covenants:

(a) NYU and PIB represent that they are educational corporations, duly incorporated, validly existing and in good standing under the laws of the State of New York with full power and authority to own their properties and conduct their operations as now being conducted, and to enter into and perform the acts and agreements herein contemplated and made.

(b) The parties hereto agree to keep the State Education Department fully informed with respect to the terms and conditions of this Agreement, and any modifications thereof, and with respect to action taken pursuant thereto. The parties further agree to cooperate promptly and effectively with the State Education Department in the implementation of this Agreement.

(c) The parties hereto agree to execute and deliver all such other and additional documents and instruments as may be necessary or desirable in order to effectuate the provisions and purposes of this Agreement.

(d) The parties hereto agree that their obligations to each other are fully set forth herein and

that the provisions hereof constitute the whole agreement between the parties. No oral modifications or additions hereto shall be binding.

(e) The representative of the parties represent and warrant as follows:

(i) The representatives of NYU and PIB represent and warrant that they are authorized by their respective Boards of Trustees to enter into this Agreement, and

(ii) The representatives of the PIB faculty and the NYU/SES faculty represent and warrant that they are authorized by the membership of the PIB faculty and the NYU/SES faculty respectively to enter into this Agreement.

ARTICLE IX

MUTUAL INDEMNITIES

Section 1. Except as may be required by the government agencies or other sponsors of the research contracts and grants assigned pursuant to this Agreement, PIB does not assume any contracts, commitments or liabilities, contingent or otherwise, of NYU, it being understood that the transactions contemplated by this Agreement, although referred to as a "merger," consist principally of a transfer of faculty and the assignment of research and training contracts and grants. Without limiting the generality of the foregoing, PIB assumes no liability for payment of salaries, retirement contributions or other obligations to any present or former faculty member of NYU arising prior to (or with respect to a period prior to) the date of the commencement of his employment by PIB or MI.

Section 2. PIB and MI hereby indemnify and will hold harmless NYU (and each Trustee or other officer of NYU) from and against any and all losses, claims, damages or liabilities to which NYU (or such Trustee or other officer) may become subject (including any legal or other expenses reasonably incurred in connection therewith) insofar as such losses, claims, damages or liabilities arise out of or are based upon (i) any nonperformance by PIB or MI of its

contractual obligations to faculty members transferred to PIB or MI under new contracts made with PIB or MI, (ii) any operations of PIB or MI subsequent to the Closing referred to herein, or (iii) the claims of present or former faculty members, students or employees of PIB based on the transfer contemplated by this Agreement.

Section 3. NYU hereby indemnifies and will hold harmless PIB and MI (and each Trustee or other officer of PIB and MI) from and against any and all losses, claims, damages or liabilities to which PIB or MI (or such Trustee or other officer) may become subject (including any legal or other expenses reasonably incurred in connection therewith) insofar as such losses, claims, damages or liabilities arise out of or are based upon the operations of NYU/SES prior to the Closing referred to herein, including, without limiting the generality of the foregoing, the matters referred to in subparagraph (a) of this article as not being assumed by PIB or MI.

Section 4. Upon the presentation in writing of any claim or the commencement of any suit against any defendant in respect of which indemnity may be sought by virtue of paragraphs (b) or (c) above, such defendant shall with reasonable promptness give notice in writing of such claim or suit to the indemnifying party. The indemnifying party

shall be entitled to participate at its own expense in the defense, or, if it so elects, to assume the defense of any such claim or suit, but if the indemnifying party elects to assume the defense, such defense shall be conducted by counsel chosen by the indemnifying party and satisfactory to the defendants who are parties to such suit or against whom such claim is presented.

ARTICLE X

CLOSING

Section 1. Consummation of this merger shall take place at 11:00 a.m., June 29, 1973, or at such earlier date as the parties hereto may mutually agree upon in writing, at the offices of Royall, Koegel & Wells, Esqs., 200 Park Avenue, New York City, which consummation is the "Closing" and which date is the "Closing Date."

Section 2. The actual transfer of the faculty and staff of NYU/SES shall take place on September 1, 1973 and all NYU/SES faculty members shall be covered by their present appointments through August 31, 1973.

Section 3. The administrations of NYU and PIB shall appoint a task force which will be in charge of the moving of all equipment. The cost of such move is to be borne by PIB except for summer salaries not to exceed $50,000 of appropriate NYU faculty members and staff which will be assumed by NYU.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be entered into and signed by their respective representatives as of the day and year hereinabove first set forth.

NEW YORK UNIVERSITY

By _____

POLYTECHNIC INSTITUTE OF BROOKLYN

By _____

THE FACULTY OF NEW YORK UNIVERSITY SCHOOL OF ENGINEERING AND SCIENCE

By _____

THE FACULTY OF POLYTECHNIC INSTITUTE OF BROOKLYN

By _____

APPENDIX B

EXCERPTS FROM INTERVIEWS

Lessons learned in aftermath of interview

"Don't fool yourself into thinking that you are going to solve all the problems two institutions have when they merge. In fact, without some foresighted planning you are apt to compound the problems unless you look ahead to what needs the resulting merger will have to face."

-- Polytechnic administrator

"The major benefit I see is the influx of a fairly large number of new people with different ideas, backgrounds, and ambitions that has helped keep the school from stagnating. When forced to let people go over a period of time, there is a loss of effectiveness in intellectual curiosity and liveliness. New personalities and different ideas have had a good effect."

-- Polytechnic department head

"Major results of merger were that a major competitor is now out of business, and the legislature had an incentive to give a subsidy that carried the merged Institute for a while."

-- Polytechnic department head

"It was said that PIB had political influence stronger than NYU. But NYU managed to get $60 million from sale of its uptown campus while transferring its obligations to more than 60 tenured faculty. All the merged institution got was at most $6 million in help from the state with increased commitments that cost it a lot more than that."

-- Polytechnic administrator

"If there had only been $10 million offered to create the finest possible new institution, instead of relatively little gap-bridging money, the negotiators of this merger might have focused on positive elements along with their perceived need for protecting their pay and fringe benefits."

-- Polytechnic department head

"We had long delays in forming the Search Committee to find the first President of the new Polytechnic, because neither the NYU-SES alumni or students designated members."

-- Polytechnic trustee

"The new merged institution should have been given lists of entering SES students and of alumni. In business, when two companies merge you start with a customer list and a list of suppliers."

-- Polytechnic trustee

"Faculty pay at SES was higher than at PIB. This caused resentment. PIB people got salary adjustments, while for three years those from SES did not get raises. On a personal level, by now the faculty is pretty well integrated."

-- Polytechnic department head

"Merger had a lot of heartbreaks. NYU continues in Applied Science, still in competition with Polytechnic, even though one purpose was to reduce excess of engineering institutions. Polytechnic was supposed to get the great men on the SES faculty. We got some, but not all."

-- Polytechnic trustee

"The new institution had an opportunity to restructure itself. That was difficult with a new President not familiar with the PIB operation. Desirable steps were not taken."

-- Polytechnic department head

"There are now totally changed modes of operation. PIB had only graduate students at Farmingdale. Now there are undergraduates there, too, and now there are graduate students at Westchester."

-- Polytechnic administrator

"The people who want an institutional merger should just go ahead and do it. Time will take care of the protests if the plan makes sense."

-- Institutional consultant

Lessons learned from merger negotiations

"I believe we spent too much time worrying about the politicians and the politics. Most people believe that the decision to move to Brooklyn was a political one. There wasn't enough time spend worrying about the institutions.

"Putting together the package that ultimately Polytechnic had to live with, I don't think that all the necessary research work was done. I don't think that the break-even budget was as realistic as it should have been, so that the magnitude of the problems would not have faded away for a year or so before the school was hit with them again.

"The facilities at the Heights campus are not being used to the best advantage of the City of New York. I think the community around it deteriorated at perhaps a more rapid pace as a result of the sale of the campus. The impact of the sale on the Bronx community should have been more carefully thought out."

-- a negotiator

"To get the numbers down to reasonable levels -- there's a certain amount of backing into numbers -- we said there had to be some new income generated by the new enterprise. We said that the students they

had in Brooklyn plus the students coming from SES would not be enough, considering the number of faculty. Early retirements to reduce the number of faculty might not go as rapidly as they would like. New sources of revenue therefore had to be found.

"There were two locations talked about. One was at Farmingdale on Long Island. The other was in Westchester. It appeared they had a better chance of the first, since they already had graduate training that should attract undergraduates to the Farmingdale center.

"The State would have been unwilling to accept any budget that did not show break-even. If everything had gone perfectly, which never happens, they could have broken even: -- if aerospace research had come over, if the Island operation developed, if they had been able to do something in either Manhattan or Westchester. We came up with what turned out to be a paper plan, given the time frame the law demanded."

-- a negotiator

"Everyone participating had the best interests of all concerned at heart. Neither the President nor Chancellor of NYU had many options at his disposal. There is no question that [President James M.] Hester would not have made this move if he had other alternatives. But he didn't have any.

"Efforts were made on behalf of staff members as well as faculty, trying to place them in jobs either at Washington Square or Bronx Community College. Most of the people have been placed. But because of the nature of what took place, I don't think anybody feels he or she was treated fairly."

-- a negotiator

"The State Education Department had to effect this merger and balanced budgets, as the law required.

"NYU had to sell its uptown campus. Had it not done so, NYU would have not only used up all its unrestricted endowment but had a short-fall besides in 1972-73. It would have had to find more money to pour into operation. That would have meant going to court to get a release on restricted endowment, which is a drawn-out procedure. It probably would have had to close the Heights campus anyway. If it had not sold that campus the NYU financial condition would have been such that it would not have survived as we know it. Segments would have survived, but other segments would probably have closed. Segments that were self-sufficient probably would have kept going. That's how serious it was.

"If the campus had not been sold, I don't know what would have occurred. We did not have a very good fall-back plan. PIB was also under the gun. The State was not going to continue funding its deficit. I am not sure this was the State Education Department's first choice. It might have preferred a State University of New York in the Bronx, if the City University had not fought that."

-- a negotiator

"We properly considered the future of each student. That was uppermost in everybody's mind. It worked out reasonably well.

"The Acting Provost and the Deans of the Schools of Arts & Sciences and of Engineering & Science met. University College students were told well in advance of the time they would have to register that they could continue their courses at Washington Square under the rules that existed at University Heights, which did not have any requirements while Washington Square did.

"The question of what would happen to the engineering students took a little longer. There was some question whether or not the merger would in fact go through. There were questions as to financial aid and assistantships. They probably got their information later than University College students did, but nevertheless in sufficient time to make other plans if they desired to do so.

"When on matters where decisions had not been made, as in the case of SES students, these were questions that somebody was constantly working on. Students were kept informed of what was going on. They were made privy to the conversations taking place on what their future would be."

-- a negotiator

"I know that a lot of SES students were upset that they did not know sooner. There were some things that had to be worked out, such as tuition remission for students who were dependents of NYU faculty, but they were notified of the major bits of information prior to January 1."

-- an SES administrator

"There was the whole problem of attitude on the part of the NYU-SES people. It was as though they were drawing up articles for a marriage with a carter's daughter."

-- a PIB Trustee

"When we talked about the part of the agreement that called for possibly using Washington Square as a facility the merged institution could use, I never was so amazed in my life. There are so many facilities there the students from here can get to on the subway. A close friend of mine on the Polytechnic faculty said he would feel like a second class citizen at NYU."

-- former SES administrator

"NYU-SES students had no idea until the very last minute they could continue their studies. In July we received a list of 1200 students. Only half came after we contacted them directly. Many full-time graduate students came with their professors, but had there been assurance about what would happen to them and be done for them, many more might well have come."

-- Polytechnic administrator

"Some tougher decisions should have been made initially, such as not offering jobs to all the faculties. If everybody were fiscally realistic and responsible, a different kind of financial decision would have been made. It would have been based upon what was really needed to educate the number of students the merged institution was going to have, difficult as such a decision would have been to carry out, considering tenure and everything else.

"I don't think it was any less painful to do than what was done in offering everybody jobs. The situation was uncomfortable enough for both the PIB and NYU-SES faculty, keeping everyone in a state of nervous concern for a period of time. Some tougher decisions should have been made."

-- a negotiator

"The surprise to me was that there were not only two sides to the negotiations, between the two institutions, but that when you were with the faculties and administrators of each you found that each of the four parties had adversary positions against all the other three."

-- a negotiator

"The State Education Department was a fifth party whose spokesman felt they had to insist on certain conditions whether any of the others wanted them."

-- a negotiator

"Looking back, I am sure that at the end 80% of the final agreement could have been arrived at when we began negotiating. So much of what we wrangled over was -- or should have been -- obvious at the start. Why we punished ourselves by discussing so many matters heatedly into the small hours of the morning for months on end is hard to understand. And yet persons who know much more about negotiating than I do say that the parties must test one another to find out if they really mean what they say."

-- a negotiator

Lessons learned from conditions and events before merger

"Educational institutions should share resources. Most are reluctant to do that. The cost of higher education is greater than it has to be. Cooperation works in sharing a computer, library holdings, and a lot else. Had these colleges done this during the expansion in the early 1960's, there might have been less duplication. It might not have been necessary for NYU-SES and PIB to merge."

-- an administrator

"When I got here in 1957 the faculty had 185 members. It grew to 330 by 1968."

-- a PIB department head

"In the early 1960's the Microwave Research Institute became a PIB academic department after a struggle within the faculty. By a 53-50 vote its members became tenured. This meant adding 20 senior professors who are excellent scientists, but who do little teaching beyond their work with graduate students. That action weakened PIB's ability to survive when outside research funding receded."

-- a PIB department head

"It was a mistake to make public announcement of the PIB-SUNY merger without having a legally binding document. Instead of a statement from a Chancellor, who was succeeded by another that did not feel the same way, a private institution must deal with the corporate body empowered to make such an agreement."

-- a PIB department head

"In March it was all set to sell University Heights to SUNY. At a meeting of department chairmen in the SES Dean's Office President Hester said he had agreement from SUNY Chancellor Boyer the engineering school would be absorbed. Then I went to England. When I got back home a call came from a colleague, saying the whole thing had gone to pieces. Washington Heights was being sold to Bronx Community College."

-- an SES department head

"Both NYU's President and Chancellor believed from their talks in Albany that SUNY would buy the Bronx campus to have a State University engineering school there, and that the Governor would support it.

"At the same time CUNY was setting out to build a new campus for Bronx Community College. The unwritten agreement CUNY had that SUNY would not operate in the five boroughs made that a natural."

-- an SES faculty member

"There was a talk of a CUNY Engineering merger with SUNY at the Heights campus. But I'm not sure that anybody really took that seriously. Certainly CUNY did not. It did not have even a remote possiblity."

-- an NYU administrator

"There was a lot of sympathy for the engineering school. Our faculty decided we would tear down the merger. We showed Washington Square we could move the school there without it costing the University money.

"After the first merger agreement was signed by the NYU and PIB Presidents, we held a big faculty meeting at SES. Miguel de Capriles, the NYU vice president for law and former Law School, dean -- a jewel of a guy -- had to tell us if we didn't sign the merger agreement we were going to be fired. But our lawyer, with whom he seemed to get along fine, said he thought if we turned down the merger agreement there was a good chance we'd be moved to Washington Square.

"The State Education Department got a call from de Capriles saying 'We're moving SES to Washington Square.' The State said that would

be illegal and they would not let NYU do it. Under the law in New York State a university can't move from one locality to another.

"As time went on our Ad Hoc Faculty Committee kept losing members. Our lawyer said we were like an iceberg moving south. In August Toni Ferri, a very emotional guy, went to see our lawyer. Ferri was working on supersonic flow, and said he could bring a million dollars worth of contracts with him. He also said that regardless of what happened on merger NYU was going to get the short end of the stick because it had no political clout, and Poly did have that."

-- an SES faculty member

"In any merger with a public institution, have a strong politician on your side. Considerations of educational merit are secondary."

-- an SES faculty member

"In all discussions of a PIB-SUNY merger, the specter of the huge costs incurred in the SUNY-Buffalo merger had a chilling effect. The legislature was not going to stand for any such expenditure."

-- PIB department head

General observations about academic mergers

"Both Case Western Reserve and Carnegie Mellon had serious problems in being unable to balance their budgets in the wake of mergers. The fact that they were merged institutions had no relation to the particular difficulties, many of which were affecting all of higher education. Declining enrollments were such a factor. And Carnegie Mellon took on large costs in a program for disadvantaged students and considerable expansion of its computer capability; neither of these had anything to do with merger."

-- an academic consultant

"When you enter any exploration of a merger that promises to be problem-solving, move fast. As time goes by, conditions change. The same positions are held by different people. Those who made commitments earlier are no longer there."

-- a Polytechnic department head

"A check-list of relative quality of institutions considering merger would have to include the assumption of debts, the nature of the curricula, the learning requirements, the difficulties of operation, the number of tenured people, and the liabilities being assumed."

-- a college President

APPENDIX C

RECOMMENDED REPORTING SCHEDULE FOR POLYTECHNIC INSTITUTE OF BROOKLYN AS REQUIRED BY CHAPTER 708 OF THE LAWS OF 1973 SECTION 13

1. Five-Year Financial Report

That the Commissioner will hold PIB responsible for meeting the conditions of its five-year financial report as approved by the Regents on May 11. That the college will provide to the Commissioner on a quarterly basis (fiscal year July 1 to June 30) evidence that they are meeting the basic assumptions and are within the financial projections contained in the report.

PIB will present written data to indicate progress in meeting the specific recommendations in the following areas of their five-year plan:

a) Student-Faculty Ratios

Year	Enrollment	Total Faculty (F. T. E.)	Total Teaching Faculty (F. T. E.)	Total Student-Faculty Ratio	Student-Teaching Faculty Ratio
1973-74	2,650	297	257	8.9:1	10.3:1
1974-75	2,750	267	227	10.3:1	12.1:1
1975-76	2,950	230	190	12.8:1	15.5:1

The above projections assume that 40 (F. T. E.) faculty will be engaged in sponsored research activities.

b) Research Recovery Revenue ($000)

Year	Revenue	Expenditures	Recovery
1973-74	$4,800	$3,430	$1,370
1974-75	5,000	3,580	1,430
1975-76	5,200	3,710	1,490

c) Student Financial Aid Expenditures

That the maximum level of expenditures in this area will be $1,350,000 annually during the period 1973 thru 1976.

2. Monthly Operating Report

That PIB will provide to the Commissioner on or before the 15th of each month, an operating report for the previous month indicating income and expenditures. The income report will show revenues that have been collected to date by major categories. The expenditure report will indicate expenditures for the month in all major categories and a percentage of expenditures for the entire year.

3. Monthly Development Report

That the college will submit to the Commissioner on or before the 15th of each month a Development Office report indicating all monies that have been secured during the previous month from external sources and a statement on how these monies are to be applied. The financial plan projects $550, 000 in unrestricted revenue in 1973-74 and $600, 000 in 1974-75.

4. Source and Application of Funds Statement (Cash Flow Chart)

That PIB will provide to the Commissioner a cash flow chart projecting revenues and expenditures for the entire fiscal year. This chart will be due within 15 days after the closing of registration for the fall semester and will be revised within 15 days after the closing of the registration for the spring semester.

5. Student Retention Plan

That the college submit to the Commissioner on or before the 15th of October a plan to increase student retention from the current level of approximately 66 percent to at least a retention rate of 75 percent effective for the fall term of 1974.

6. Academic Program Evaluation

That PIB submit to the Commissioner on or before the 15th of October 1973 a plan indicating what academic programs will be continued and the minimum number of faculty required in each area. Rationale for program retention will also be included.

7. Annual Operating Budget

That the college submit within 15 days of the close of registration in the fall semester an annual operating budget showing all major revenue and expense categories. That a revision of the annual budget be submitted within 15 days of the close of registration in the spring semester.

8. Payment of State Funds

That the 3 million dollars of State funds be paid to PIB on a quarterly basis with the first payment being made on or about October 15, 1973. The remaining payments to be paid in 1974 during the months of January, April and June. No payments will be made until the appropriate reports have been received and approved.

APPENDIX D

BIBLIOGRAPHY

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